NAVAL POSTGRADUATE SCHOOL
Monterey, California

THESIS

DECISION MODEL FOR USING OTHER TRANSACTIONS AT DOD BUYING COMMANDS

by

William P. Hayes

December 1998

Principal Advisor: David A. Smith

Approved for public release; distribution is unlimited.

REPORT DOCUMENTATION PAGE

Form Approved
OMB No. 0704-0188

1. AGENCY USE ONLY *(Leave blank)*	2. REPORT DATE	3. REPORT TYPE AND DATES COVERED
	December 1998	Master's Thesis

4. TITLE AND SUBTITLE DECISION MODEL FOR USING OTHER TRANSACTIONS AT DOD BUYING COMMANDS

5. FUNDING NUMBERS

6. AUTHOR(S) Hayes, William P.

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)
Naval Postgraduate School
Monterey, CA 93943-5000

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES
The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.

12a. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for public release; distribution is unlimited.

12b. DISTRIBUTION CODE

ABSTRACT *(Maximum 200 words)*

Department of Defense (DoD) is operating in an environment characterized by unknown adversaries, rapid technological change and a flat defense budget. To maintain technical superiority over its potential adversaries and do it affordably, DoD must further exploit the commercial industrial base. The use of "other transactions" provides one solution. This study was conducted to develop a decision model on when to use other transactions at DoD buying commands. The intent of this OT decision model is to provide the decision-maker with a framework that identifies key factors that should be considered in determining if an OT is appropriate. Depending on what the buying command is trying to achieve will determine which factors will be pertinent in the decision process. The researcher concludes that the business decision is central to the OT decision. The other principal criteria in the OT decision process are nature of the product, non-traditional defense firms, dual-use technology, cost-share arrangement and risk analysis.

14. SUBJECT TERMS	15. NUMBER OF PAGES
Other Transaction Decision Model	144
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	18. SECURITY CLASSIFICATION OF THIS PAGE	19. SECURITY CLASSIFICATION OF ABSTRACT	20. LIMITATION OF ABSTRACT
Unclassified	Unclassified	Unclassified	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18 298-102

Approved for public release; distribution is unlimited.

DECISION MODEL FOR USING OTHER TRANSACTIONS AT DOD BUYING COMMANDS

William P. Hayes
Lieutenant Commander, United States Navy
B.B.A., University of Notre Dame, 1988

Submitted in partial fulfillment of the
requirements for the degree of

MASTER OF SCIENCE IN MANAGEMENT

from the

NAVAL POSTGRADUATE SCHOOL
December 1998

Author: _____
William P. Hayes

Approved by: _____
David A. Smith, Principal Advisor

_____
Mark W. S tone, Associate Advisor

_____
Reuben T. Harris, Chairman,
Department of Systems Management

ABSTRACT

Department of Defense (DoD) is operating in an environment characterized by unknown adversaries, rapid technological change and a flat defense budget. To maintain technical superiority over its potential adversaries and do it affordably, DoD must further exploit the commercial industrial base. The use of "other transactions" provides one solution. This study was conducted to develop a decision model on when to use other transactions at DoD buying commands. The intent of this OT decision model is to provide the decision-maker with a framework that identifies key factors that should be considered in determining if an OT is appropriate. Depending on what the buying command is trying to achieve will determine which factors will be pertinent in the decision process. The researcher concludes that the business decision is central to the OT decision. The other principal criteria in the OT decision process are nature of the product, non-traditional defense firms, dual-use technology, cost-share arrangement and risk analysis.

TABLE OF CONTENTS

I. INTRODUCTION

A. GENERAL

The purpose of this thesis is identify principal criteria for the decision-maker to determine when to use "Other Transactions" (OTs). The researcher will develop these principal criteria into a decision model for when to use OTs in lieu of a standard procurement contract, grant or cooperative agreement.

B. OVERVIEW

In February 1998, Jacques S. Gansler, the Under Secretary of Defense for Acquisition and Technology addressed how the Department of Defense (DoD) needs to transform the way it does business when he stated,

> These are exciting and challenging times. Between the geopolitical changes, the technological changes, the military changes and the budgeting constraints [DoD] is under, it is an area that does not lend itself to a 'status quo' posture. In fact, a dramatic transformation is required. [Ref. 1:p. 1]

The demise of the Soviet Union dramatically changed DoD's environment. This imposing, clearly identifiable threat had shaped U.S. military strategy, DoD's budget, DoD's force levels and DoD's weapon system designs. [Ref. 2:p. 3] With the collapse of the Soviet Union, the Congress and the President could no longer support DoD's Cold War budget, force levels or pace of weapon system acquisition; the Congress and the President mandated dramatic decreases in all three. [Ref. 2:p. 3] Declining budgets through the 1990s caused DoD to defer modernization of its weapon systems to sustain its downsized, but still substantial, existing systems and forces. With the emergence of

new threats, aging systems and "potential new technologies available to our potential adversaries on a worldwide basis," DoD must rapidly modernize its forces to address these threats and incorporate new technologies without increasing its budget. [Ref. 1:p. 1]

DoD cannot accomplish these tasks without making significant changes in its acquisition system. Technology advances in the commercial sector, particularly in electronics and information systems, have greatly outpaced DoD's acquisition system. [Ref. 3:p. 2] Some studies have shown that fielding major weapon systems can take up to 15 years using traditional contracting methods. [Ref. 1:p. 2] This lengthy acquisition cycle time drives up the cost of weapon systems without delivering increased performance. DoD has to shorten its acquisition cycle time to capture the commercial sector's technologies, avoid delivering technologically obsolete equipment to its users, and to decrease its acquisition costs.

DoD is looking for alternatives to shorten its cycle time. The use of OTs is one method DoD is pursuing. Congress granted Defense Advanced Research Projects Agency (DARPA) the authority, under 10 U.S.C. 2371, to use "transactions other than contracts, grants or cooperative agreements in carrying out basic, applied and advanced research projects." [Ref. 4] DARPA has interpreted OTs to be a "distinct class of transactions outside the procurement and assistance categories" and not subject to Federal Acquisition Regulation (FAR), Defense Federal Acquisition Regulation Supplement (DFARS) and the laws and regulations applicable to grants and agreements. [Ref. 5:p. 35]

Freed from bureaucratic, time-consuming regulations, DARPA has been able to attract commercial firms, that otherwise would not do business with the Government, to engage in cutting-edge technology. The use of OTs has provided DoD a method to collaborate and team with commercial industry through innovative, cost-sharing arrangements. These cost-sharing arrangements establish a financial level of commitment between DARPA and commercial firms. These arrangements also allow DARPA to influence the firms' R&D efforts into "developing militarily useful, commercially viable technology." [Ref. 6:p. 1] Both parties benefit; the commercial firms benefit by being provided additional funds to continue research, while the Government benefits by getting access to technology that is "more affordable, always available and continuously improving." [Ref. 7:p. 1] The benefits of using OTs have been evident at DARPA. What is less clear are the risks associated with the use of OTs and if the same benefits can be realized by DoD's major systems buying commands.

Congress originally limited the use of OTs to DARPA, DoD's central R&D organization. DARPA's successful implementation of OTA has encouraged Congress to expand this authority to the Services. The Services' effective implementation of OTA will be contingent on prudent, sound business decisions.

In this thesis, the researcher, first, identifies and examines the objectives of DoD buying commands in using OTs. Next, the researcher identifies their decision criteria for selecting OTs over other contractual instruments. From there, the researcher examines the decision process to determine if the commands use a decision hierarchy and if any barriers exist limiting the use of OTs at their commands. The final part of the

researcher's analysis will examine the approval process for OTs at these buying commands. Applying this analysis, the researcher will develop a decision model to assist DoD buying commands in deciding when to use OTs.

C. RESEARCH OBJECTIVE

Through literature research and interviews with DoD buying commands, DARPA, the National Imagery and Mapping Agency (NIMA), and OSD personnel, the researcher identifies principal criteria used in the OT decision process. The researcher develops these principal criteria into a decision model on when to use OTs in lieu of a standard procurement contract, grant or cooperative agreement.

D. RESEARCH QUESTIONS

1. Primary Research Question

What are the principal criteria to consider in developing a decision model for determining when to use OTs?

2. Subsidiary Research Questions

1. What are the essential elements of an other transaction?
2. What policies and restrictions limit the use of other transactions?
3. What are the essential elements of a decision model?
4. What are the principal objectives of DoD major buying commands in using other transactions?
5. What criteria did DoD major buying commands use to determine when to use OTs in lieu of other contractual relationships?

E. SCOPE OF RESEARCH AND LIMITATIONS

This thesis is directed toward management personnel involved in the decision process for OTs. This thesis develops a decision model for determining when it is appropriate to use OTs over other contractual instruments, including standard procurement contracts, grants and cooperative agreements. The decision model is qualitative in nature and intended to provide a framework for managers to make good business decisions in the use of OTs. This model is not intended to be a quantitative model.

In identifying the decision criteria for OTs, the researcher has interviewed ten DoD buying commands. The interviews were conducted with decision-makers in the OT process, including Directors of Contracting, Procuring Contracting Officers and legal counsel.

This researcher assumes that the reader has a basic understanding of DoD's acquisition process.

F. RESEARCH METHODOLOGY

A comprehensive review of the available literature was conducted using the Naval Postgraduate School (Knox) Library, the Systems Management Acquisition Library and the Internet. The literature review included: (1) Professional journals and periodicals; (2) Research reports published by the Naval Postgraduate School; (3) DoD Publications and Guidance; (4) Government audit reports; (5) United States Code and (6) Internet web sites.

Personal and telephone interviews were conducted with Government contracting, legal and policy personnel. The interview questions are found in Chapter IV.

G. ORGANIZATION OF THE STUDY

Chapter I identifies the focus and purpose of the thesis, including the primary and secondary research questions.

Chapter II discusses the DoD environment from which OTs originated, reviews the legislative history of OTs and examines what, why and how you use OTs.

Chapter III identifies and discusses two types of decision models: the Rational Decision Model and the Descriptive Decision Model. The final part of the chapter discusses the decision process of selecting contract type.

Chapter IV presents and analyzes the data collected in the personal and phone interviews. The chapter presents the intent of the interview process, a description of the interview methodology, a categorization of the results and the researcher's analysis.

Chapter V uses the decision framework provided in Chapter III with the data collected in Chapter IV to develop a decision model on when to use OTs.

Chapter VI presents the conclusions and recommendations generated by this research. The research questions are answered and areas for future research in OTs are identified.

II. "OTHER TRANSACTIONS" BACKGROUND

A. INTRODUCTION

The purpose of this chapter is to provide the reader sufficient background information into other transactions (OTs). This background information forms a framework around which a decision-model on when to use OTs is developed. The chapter is divided into five parts. The first part discusses the Department of Defense (DoD) environment from which OTs originated. Next, the legislative history of OTs is provided. The final three parts identify what, why and how OTs are used.

This researcher recommends reading two recent research efforts conducted at the Naval Postgraduate School (NPS) on OTs. These theses have provided much of the background information for this thesis. Each focused on a specific area of OTs. Howell studied if DoD could use OTs in lieu of the standard procurement system to more effectively apply commercial Research and Development (R&D) efforts to military systems. [Ref. 8] Slade's thesis researched OT use in prototype development. [Ref. 9] Specifically, he examined the 1997 Commercial Operations and Support Savings Initiative (COSSI) and identified what benefits and limitations contractors perceived using OTs.

B. DOD ENVIRONMENT

Before examining OTs, the reader must first understand the environment from which they originated. Since the demise of the Soviet Union, DoD is operating in a new environment, an environment characterized by decreasing force levels and budgets, yet

riddled with uncertainties and unknowns. [Ref. 3:p. 1] To operate in this new environment DoD made substantial changes in its strategy and warfighting doctrine. [Ref. 3:p. 1]

Joint Vision 2010 is DoD's new strategy to confront emerging threats in the 21st century. [Ref. 10] A central tenet of this strategy is technical superiority over potential adversaries. [Ref. 3:p. 1]

Critical [technological] advances will have enormous impact on all military forces. Failure to understand and adapt could lead today's militaries into premature obsolescence and greatly increase the risks that such forces will be incapable of effective operations against forces with high technology. [Ref. 10:p. 11]

Technological superiority poses serious concerns to DoD. First, DoD's acquisition system is not keeping up with changes in technology. Technology is changing so fast, particularly in electronics and information systems, that DoD is often fielding technologically obsolete weapon systems. [Ref. 11:p. 2] Second, potential adversaries are able to integrate current technology into their weapon and information systems because they lack a cumbersome acquisition infrastructure. [Ref. 12:p. 7] Larry Lynn, Deputy Under Secretary of Defense for Advanced Technology (DUSD (AT)), testified to the House Armed Services Committee,

> Our prospective adversaries are able to obtain an unlimited amount of modern equipment on the open market and therefore able to field at commercial rates of perhaps three to five years. [Ref. 3:p. 3]

Another major concern for DoD is the dramatic decline in the defense budget. DoD has seen its budgets decline significantly since the 1980's. In constant dollars, DoD

procurement outlays in Fiscal Year (FY) 1995 were 52% smaller than 1987 levels. [Ref. 13:p. 2] With a smaller budget, DoD needs to get the most out of its limited resources.

These concerns fueled changes in how DoD does R&D and acquisition. With fewer R&D resources, DoD requires a coordinated R&D plan between the Services to use limited resources for the most promising R&D efforts, and to prevent duplication between the Services. For the first time, a Defense and Science Technology Strategy emerged to identify DoD's science and technology objectives and priorities. [Ref. 3:p. 1] The objectives and priorities identified within the strategy were threefold: to identify and exploit technologies with both a military and commercial application, to get technology in the hands of the warfighter more quickly and to increase affordability of DoD's weapon systems. [Ref. 3:pp. 1-3] These objectives and priorities are discussed in the following paragraphs.

1. Defense and Science Technology Strategy

a. Dual-Use Technology

A critical component of the Defense Science and Technology Strategy is to identify and make better use of technology that has both commercial and defense applications, commonly referred to as dual-use technology. [Ref. 3:p. 1] Rapid, technological advances have been made in the commercial sector. DoD can no longer ignore this fact and must find a way to access and influence these commercial technological breakthroughs into dual-use technologies. [Ref. 12:p. 9] The Director for Defense Research and Engineering (DDR&E), Ms. Anita Jones, cited the purpose for dual-use technology.

> One key reason for investing in dual-use is that as the procurement budget goes down, so does the amount of money the industry is investing in defense research and development. In areas such as electronics, industry is already investing more in R&D money than the Government, and for national security reasons, we need to have access to that technology. [Ref. 3:p. 2]

Through the use of OTs, DoD has established one way to access commercial firms developing technologies that could be converted into dual-use. [Ref. 5:p. 37]

b. Technology Demonstrations

A second major component to the Defense Science and Technology Strategy is to get technology in the hands of the warfighter more quickly through the use of Advanced Concept Technology Demonstrations (ACTDs). [Ref. 3:p. 3] DoD currently fields major weapon systems in around 13 to 15 years. [Ref. 1:p. 2] "With electronic products now often out of date in 18 months, we can no longer afford to maintain our existing deployment cycle." [Ref. 1:p. 2] Larry Lynn has voiced in Congressional Testimony similar concerns about DoD's acquisition system.

> If we don't change our ways, we are doomed to perpetual equipment obsolescence in critical areas such as electronics and information-intensive concepts. [Ref. 3:p. 3]

ACTDs bring the acquisition and operational communities together to identify significant military requirements that can be met with today's technology. [Ref. 14] ACTDs allow DoD to quickly field prototypes in an operational environment for testing. This "fly before you buy" c :ept mitigates risk by allowing the warfighter to validate the performance of the prototype before committing resources and time to

acquire new systems. [Ref. 14] ACTDs are executed through OTs. The use of OTs provides DoD flexibility to rapidly award prototype projects without having to go through DoD's acquisition milestone process. [Ref. 5:p. 34]

c. Technology and Affordability

The third component in this strategy recognizes the fiscal realities confronting DoD. With smaller budgets, DoD has to find ways to reduce the costs of its weapon systems. [Ref. 3:p. 3] Technology should not only be used to enhance performance, but to increase affordability. One of the ways for DoD to maximize its resources is to elevate the importance of cost. Cost traditionally has been a lower priority than performance and schedule. DoD can no longer afford this view. [Ref. 15:p. 2] DoD Directive 5000.1 now requires cost to be treated as an independent variable (CAIV). Program Managers must trade-off performance and schedule against cost objectives. [Ref. 16: 2.5.2.4(c)]

The use of OTs brings technology and affordability together by expanding the industrial base through the entry of non-traditional defense contractors. [Ref. 3:p. 3] Through the integration of the military and commercial industrial bases, DoD can reap the benefits of production economies of scale and access state-of-the-art technology. [Ref. 3:p. 1]

As DoD is significantly revising how it does R&D, DoD must also fundamentally reform its acquisition system to take advantage of dual-use opportunities, ACTDs and affordability constraints.

2. Acquisition Reform

The intent of the latest wave of acquisition reform is to change "what we buy and how we buy it." [Ref. 1:p. 1] Acquisition Reform has brought about positive changes in DoD's acquisition system, but there is still more to do. DoD's acquisition system still "costs too much, takes too long and most importantly falls below desired quality and performance." [Ref. 1:p. 1] In 1993, Ms. Colleen Preston, former Under Secretary of Defense for Acquisition Reform (USD(AR)), recognized the need to make fundamental changes in DoD acquisition to reflect the dynamic advances in technology and the shrinking defense budget.

> The world is a changing place and the challenges facing DoD are fundamentally different than they were even five years ago.... It is not enough to improve the existing system, we need a fundamental rethinking and reinvention of the acquisition system if we are to be able to respond to the demands of the market. [Ref. 17:p. 4]

One of the ways DoD is "fundamentally rethinking the acquisition system" is through the use of OTs. Acquisition Reform created the environment for OTs to emerge. In the remaining parts of this chapter, the researcher examines the legislative history of OTs and what, why, and how OTs are used.

C. LEGISLATIVE HISTORY

Authority to use OTs is derived from statutory provisions. A review of the legislative history of OTs will identify whom Congress empowered with OTA. The two primary pieces of legislation that are discussed are found in 10 U.S.C. 2371 and Section 845 of the FY94 Defense Authorization Bill. This part concludes with a brief discussion

of the Defense Advanced Research Projects Agency (DARPA), formerly ARPA, because of its significant role in the implementation of OTA.

1. 10 U.S.C. 2371

OTA was originally granted on a three-year trial basis to DARPA in 1989. [Ref. 4] Congress has since made the authority permanent and extended this authority to the Secretaries of the Services under the FY 92/93 Defense Authorization Bill. [Ref. 4]

The Secretary of Defense and the Secretary of each military department may enter into transactions (other than contracts, cooperative agreements, and grants) under the authority of this subsection in carrying out basic, applied, and advanced research projects. [Ref. 4]

2. Section 845 Prototype Authority

Under the FY94 Defense Authorization Bill, Section 845, Congress amended OT authority to include prototypes that are "directly relevant" to weapons or weapon systems "proposed to be acquired". [Ref. 9:p. 11]

The Director of Defense Advanced Research Projects Agency may, under the authority of section 2371 of title 10, United States Code, carry out prototype projects that are directly relevant to weapon or weapon systems proposed to be acquired or developed by the Department of Defense. [Ref. 9:p. 11]

Congress granted DARPA temporary authority to use OTs to engage in purely military prototype projects on a three-year trial basis. [Ref. 18:Sec. VI, p. 5] Congress has since extended and expanded this authority through FY 01 by granting OT authority to the Service Secretaries of the military departments. [Ref. 19:p. 35] and [Ref. 20]

Congress has made OT authority for research projects permanent and has extended the authority to prototype projects on a trial basis through FY01. Congress granted this authority first to DARPA. Only after DARPA's successful implementation of OTA for both research and prototype projects, did Congress extend the authority to the Services. DARPA has played an instrumental role in furthering the use of OTA and warrants further insight into this organization.

3. DARPA

DARPA is the central R&D organization for DoD. [Ref. 21:p. 1] Its position is unique because its complements the Services' R&D efforts, but operates outside the bureaucracy. [Ref. 21:p. 2] In Congressional Testimony, Larry Lynn, the current Director of DARPA, differentiated his organization from the Services' R&D arms.

> DARPA's most prominent role is to invest in the highest payoff technologies and military concepts...DARPA is uniquely idea-driven and project oriented, in contrast to other agencies that are driven by formalized requirements and oriented around programmed investments. [Ref. 21:p. 2]

DARPA is intentionally small to instill flexibility. DARPA continually rejuvenates itself by turning over research programs and personnel. Programs average three to four years before either being turned over to the Services or canceled. Personnel turnover brings in fresh ideas from industry and minimizes entrenchment of ideas and policies. [Ref. 21:p. 2] In an environment characterized by risk avoidance, regulatory rules and acquisition restrictions, DARPA's culture of taking risks is refreshing.

DARPA has been a strong proponent for the use of OTA. As of 1995, DARPA has performed over 100 OTs. [Ref. 22:p. 1] DARPA's experience with OTs has

provided, and continues to provide, the Services valuable lessons to adopt before using this authority. The next part of the chapter defines OTs and distinguishes them from other "contractual" instruments.

D. WHAT IS AN "OTHER TRANSACTION"?

Under 10 U.S.C. 2371 and Section 845 of the FY94 Defense Authorization Act, authority to use OTs has been granted to DARPA and the Secretaries of the Services. The plainness of the question belies its complexity because an OT is not clearly defined. As noted by Joe Dunn, DARPA's lead legal counsel, an OT is defined by what it is not. [Ref. 19:p. 35]

An "other transaction" is not a standard contract, grant or cooperative agreement. [Ref. 19:p. 35] Standard contracts, grants and cooperative agreements are defined in the Federal Acquisition Regulation (FAR). [Ref. 16] A standard contract is used to acquire goods and services for the direct benefit of the Federal Government, while grants and cooperative agreements are used to further R&D efforts for another purpose other than for the direct benefit of the Federal Government. [Ref. 16:Part 35.002] DoD traditionally limited grants to universities and non-profit research organizations to perform research. [Ref. 5:p. 35] DoD used cooperative agreements when there was a mutuality of interest between the Government and other party to develop dual-use technology. [Ref. 18:Sect IV, p. 5]

DARPA was involved in "advancing the state-of-the-art, demonstrating technology, establishing industrial capabilities and transitioning technology into actual use."

[Ref. 5:p. 35] DARPA needed an alternative "contractual" instrument to address these needs and access commercial firms. OTs became that instrument.

OTs can be distinguished from standard contracts, grants and cooperative agreements in that they are a "distinct class of transactions outside the procurement and assistance categories" and not subject to FAR, Defense Federal Acquisition Regulation Supplement (DFARS) and the laws and regulations applicable to grants and agreements. [Ref. 5:p. 35] The legislative language for OTs was intentionally vague to provide DARPA with maximum flexibility to use it when other instruments were not appropriate. [Ref. 8:p. 20] DARPA used OTA to attract commercial firms and consortia that were developing state-of-the-art-technology.

The definition of OT, or lack thereof, did not handicap DARPA's use. DARPA used the definition of OT and the vague legislative language to its advantage to uniquely craft flexible OT agreements. As discussed earlier, DARPA has awarded over one hundred OTs. Since authority to use OTs was granted to DARPA in 1989, the enabling legislative language has not dramatically changed. [Ref. 23:p. 5] DARPA has viewed the lack of changes as a positive sign, a sign that DARPA has correctly interpreted the intent of Congress.

The Services interpreted the legislative language more strictly than DARPA. This stricter interpretation initially limited the use of OTs by the Services. [Ref. 8:p. 21] The next part of the chapter examines Congress' intent in granting OTA and how the perceived ambiguity in the authority and definition of OTs shaped DARPA and the Services' implementation of OTA.

E. WHY USE "OTHER TRANSACTION" AUTHORITY?

Using OTA requires an understanding of what the authority allows you to do, but also requires an understanding of what Congress intended when it granted this authority. Without an understanding of the spirit of the law, those empowered with authority may exceed or under use this authority. The purpose of this part of the chapter is to explore why Congress granted OTA and how DARPA and the Services' interpretation of this authority shaped their use.

1. Statutory Intent

Congress granted OTA to encourage DARPA and the Services to access the commercial industrial base. Congress originally granted this authority for research projects and then extended it to prototype projects. OTA is consistent with 10 U.S.C. 2501, which states:

It is the policy of Congress that the United States attain national technology and industrial base objectives...through acquisition policy reforms that have the following objectives:

1. Relying, to the maximum extent possible, upon the commercial national technology and industrial base...to meet the national security needs of the United States.

2. Reducing the reliance of DoD on technology and industrial base sectors that are economically dependent on DoD business.

3. Reducing Federal Government barriers to the use of commercial products, processes and standards. [Ref. 24]

Congress recognized science and technology (S&T) projects involved new technology, small start-up entities and short-lived projects that required flexibility and

reduced administrative burden. [Ref. 8:p. 19] Small firms or entities did not have or want to establish the financial reporting and cost accounting infrastructures Government contracts required. [Ref. 23:p. 8] Congress established OTA to provide DARPA and the Services maximum flexibility to pursue research and technology efforts with commercial industry outside the traditional Government contracting regulatory framework (e.g., FAR, DFARS...). [Ref. 8:p. 21]

Congress then expanded OT authority to include prototype projects. Congress intended for DoD to use the untapped commercial industrial base to inject current commercial technology into existing weapon systems (ACTDs) and to address rising Operating and Support (O&S) costs of its weapon systems (COSSI). [Ref. 9:p. 13]

DARPA has understood Congress' intent of OT authority and used it as an opportunity to successfully engage with the commercial sector. The Services have used OTs to a lesser degree. The next several paragraphs will discuss DARPA's approach to using OTs and some of its benefits.

2. OTs as an Opportunity

DARPA views the ambiguity in the legislative language as an opportunity to craft flexible agreements with commercial firms that make good business sense. [Ref. 8:p. 20] Some firms, such as Hewlett Packard and Cray Research, have consciously rejected doing business with DoD in the past because of demanding and intrusive Government regulations. [Ref. 25:p. 5] Intellectual Property Rights (IPRs) are the most commonly cited Government regulation that causes some firms to shy away from Government

business. The guiding regulation in this area is the Bayh-Dole Act.[1] [Ref. 18:Sec. IV, p.6] OTs provide DARPA and the Services the flexibility to negotiate IPRs. OTs can also provide a window of opportunity for DoD to attract non-traditional defense firms, influence R&D efforts and reduce life-cycle costs. [Ref. 15:p. 2]

a. Negotiate Intellectual Property Rights (IPR)

With OTs there is "complete freedom to resolve IPR issues." [Ref. 18:Sec. IV, p. 6] The regulatory provisions found in the FAR and statutes concerning IPRs and how they are allocated in government-funded research do not apply to OTs. [Ref. 18:Sec. IV, p.6] However, DARPA does not concede IPRs haphazardly. Though the regulatory provisions, such as the Bayh-Dole Act, are not applicable to OTs, DARPA uses them as a starting point in the negotiations. [Ref. 9:p. 17] DARPA requires the other partners to supply a convincing argument why the IPR regulatory provisions should not be applied to their project. [Ref. 5:p. 36]

b. Attract Non-Traditional Firms

Through the use of OTs and cooperative agreements, DoD has been able to attract contractors outside the traditional defense industrial base. In a 1996 study, GAO estimated that 42 percent of the 275 commercial firms that participated in one or more OTs or cooperative agreements were non-traditional defense firms. [Ref. 25:p. 5] For the 1997 COSSI, 37 percent of the 30 participants were non-traditional defense firms.

---

[1] The Bayh-Dole Act, Public Law 96-517, as amended, provides the Government's general policy regarding patent rights in inventions involving Federal funds. The Government's policy is to allow the recipient to retain title to subject inventions, but providing the Government with a nonexclusive, nontransferable, irrevocable paid-up license to practice or have practiced for or on behalf of the United States any subject invention throughout the world. [Ref. 25:p. 7]

[Ref. 9:p. 77] By expanding the industrial base to include non-traditional defense firms, use of OTs provides DoD access to state-of-the-art-technology.

c. Influence R&D

Access to state-of-the-art technology is important for DoD, but more important, is what DoD does with that access. DoD needs to take advantage of technological advances occurring in commercial industry to maintain technical superiority over its adversaries. [Ref. 28:p. 1] To develop affordable, advanced military weapon and support systems, DoD must shape and influence commercial R&D toward dual-use. [Ref. 3:p. 2] The use of OTs can provide a means to influence the R&D efforts of commercial firms. OTs for research projects require, to the maximum extent practicable, that the commercial entity contribute a 50 percent cost-share toward the research effort. The cost share provisions in OTs establish financial commitment, increase total research funding and provide tangible benefits for both parties. [Ref. 7:p. 1]

d. Reduce DoD's Life-Cycle Costs

Dual-use technology can also be used to make weapon systems more affordable. DoD must expand its focus beyond acquisition costs to the total life-cycle costs of its systems. "A major focus of our acquisition program is to reduce life-cycle costs of our existing systems." [Ref. 15:p. 1] Both DARPA and the Services have pursued dual-use technology to reduce life-cycle costs through its COSSI and ACTD programs. Both COSSI and ACTD programs use OTs as its execution instrument.

COSSI provides DoD a way to reduce weapon system modification costs by inserting prototype kits with current, commercial technology into existing weapon systems. [Ref. 9:p. 13] The objective of COSSI is to reduce the O&S costs for DoD's weapon systems.

ACTDs provide DoD a way to deliver current technology to the military user in the form of prototype demonstrators in substantially less time than the traditional acquisition system time. DoD can place the demonstrators in the hands of the user to test in an operational environment. [Ref. 3:p. 3] "Time is the enemy of higher performance at lower cost" [Ref. 1:p. 1] ACTDs provide the user better performance at reduced cost by using current technology and reducing acquisition cycle time.

The use of OTs has benefited DoD by expanding its industrial base to include non-traditional defense firms, providing access to state of the art technology and influencing these contractors to pursue dual-use technology. Through the development of dual-use technology, DoD can achieve a central objective of its national strategy: to maintain technical superiority over its potential adversaries. Dual-use technology, as demonstrated in COSSI and ACTD programs, can also be used by DoD to reduce the life-cycle costs of its weapon systems.

Despite the benefits of OTs, the Services did not pursue the use of OTs as aggressively as DARPA. [Ref. 8:p. 21] The next several paragraphs examine why the Services pursued a more conservative approach to OTA and identify some risks associated with using OTs.

3. OTA Limitations

When OTA authority was initially granted to the Services, they did not aggressively use this authority due to the ambiguity of the language and the lack of guidelines on when to use OTs. [Ref. 8:p. 21] The Services interpreted the legislative language more strictly than DARPA. The stricter interpretation initially prevented the Services from using the authority because cooperative agreements could be used, and had been used, in the past to stimulate research by for-profit firms. [Ref. 26:Encl. (1)] Another deterrent to using OTs was the lack of guidance. Guidance for OTA was not issued until February 1994, two years after authority was granted. The Services also recognized some potential risks associated with using OTs. The primary risk was the potential loss of IPRs. The ability to negotiate IPRs was earlier seen as a benefit, but it can also represent a risk. OTs lacked the IPR safeguards provided by cooperative agreements. [Ref. 27] Another risk in using OTs is the ability for either party to terminate. The Services potentially could have nothing to show for their investment. [Ref. 8:p. 31] The next several paragraphs discuss how the restrictive language, lack of guidance and potential risks limited the Services' initial use of OTA.

a. Restrictive Language

The initial legislative language for OTA was interpreted by the Services as overly restrictive, in that OTs could "only" be used when a standard contract, grant or cooperative agreement is not feasible or appropriate. [Ref. 26:Encl (1)] The Services wanted to use OTs, but could not identify opportunities to use OTs in lieu of cooperative

agreements. In the FY97 Defense Authorization Bill, Congress relaxed the language by allowing DoD to use OTs even if other instruments are more feasible. [Ref. 26:Encl. (1)]

b. Cooperative Agreements v. other transactions

The Services have predominantly used "flexible" cooperative agreements instead of OTs to stimulate research by for-profit firms. [Ref. 18:Sec. IV, p. 8] Cooperative agreements are a form of assistance instruments whose purpose is to stimulate or support research and development for other than the direct benefit of the Government. [Ref. 16:Part 35.002] The Services have had experience in using cooperative agreements prior to OTA being granted. The Office of Naval Research (ONR) was the principal user of this instrument. [Ref. 18:Sec IV, p. 3]

Though cooperative agreements and OTs have a similar purpose, they do differ in three key areas. [Ref. 18:Sec. V, p. 11]

1. Bayh-Dole Act applies.

2. Patent Right Clause in CFR 401.14 applies. This clause prevents the prime contractor from obtaining any rights from subcon-tractor's inventions under an R&D subcontract.

3. Flow-down clauses apply. Depending on the dollar thresholds, certain certifications are required by law or regulation to flow down to the prime's subcontractors. [Ref. 23:p. 50]

The Bayh-Dole Act is the primary difference between cooperative agreements and OTs. If the patent-rights provision is less restrictive than found in the

Bayh-Dole statute, then the agreement is an OT. Otherwise, the agreement is a cooperative agreement. [Ref. 28:p. 7]

c. Lack of Initial Guidance

When OTA was initially granted to the Services in 1992, the rules and regulations that contracting officers have come to rely upon were no longer applicable. The Services proceeded very deliberately limiting who could have this authority. "Because of the uncertain nature of OTs, the Services retained authority for OTs at the service major command headquarters." [Ref. 18:Sec IV, p.] Interim guidance for OTs was issued by the Director, Defense Research and Engineering (DDR&E) in February 1994. [Ref. 18:Sec IV, p. 8] Further discussion on guidance is addressed in the final part of this chapter.

d. Risk to Intellectual Property Rights(IPR)

Along with a lack of guidance, OTs were perceived by the Services to lack the IPR safeguards found in cooperative agreements. [Ref. 27] This perception contributed to selecting cooperative agreements instead of OTs. The Services, unlike DARPA, have a primary mission to develop weapon systems. [Ref. 27] Many of the research and prototype efforts the Services pursue are intended to enhance performance or reduce weapon systems' costs. [Ref. 15:p. 2] The patent-right provisions found in cooperative agreements protected the Government's interests. With OTs, the Services could, if not careful, negotiate away its IPRs.

e. Ability to Terminate the OT

OT agreements allow either the Government or the other party to terminate for convenience provided that (1)written notice is submitted and (2)a reasonable determination is made that the project's perceived benefits do not outweigh the expenditures. [Ref. 23:p. 42] By providing the other party the ability to terminate, the Government is exposing itself to risk. The Services could potentially spend public money and have nothing to show for it.

The Services need to be aware of both the benefits and potential risks associated with OTA to effectively use it. The restrictive language has been lifted and interim guidance has been issued for the use of OTA. The Services must exercise sound judgment and protect the Government's interests when using OTs. The final part of the chapter reviews what guidance and models the Services have provided on how to use OTA.

F. HOW DO YOU USE "OTHER TRANSACTION" AUTHORITY?

While starting with a blank sheet of paper enables both parties to craft a flexible agreement and eliminate onerous Government requirements, deciding what to include and exclude from an "other transaction" agreement is more difficult than one may imagine. [Ref. 29] DoD, under the auspices of DDR&E and Director of Defense Procurement (DDP), has issued interim guidance for OT research and prototype projects. DDR&E Guidance on OT for research projects is reviewed first, followed by DDP's Guidance on

OT prototype projects. This part concludes with a brief discussion on the existing models for each type of OT.

1. DDR&E Guidance

DDR&E is responsible for overseeing DoD's research efforts. [Ref. 30] DDR&E recognized there existed ambiguity, perceived or otherwise, in the use of OTs for research projects. [Ref. 28:p .1] DDR&E issued Interim Guidance in 1994, followed by Supplements in 1997 and 1998. Guidance was not formalized initially to provide the Services opportunities to test the provisions and determine which provisions were useful or if any needed to be added. [Ref. 18:Sec. IV, p .6] DDR&E Guidance for OT research projects is in the process of being formalized, but is currently pending resolution with DoDIG on audit issues. [Ref. 31]

To encourage increased and consistent use of OTs by the Services and DARPA, DDR&E did two things in its 1997 Supplement: it established clear policy for the Services and DARPA to follow and it established a new class of assistance instruments, Technology Investment Agreements (TIAs). [Ref. 28:p. 1] TIAs are a class of assistance instruments that may be used to carry out basic, applied, and advanced research projects, when it is appropriate to use assistance agreements and the research is to be performed by for-profit firms or by consortia that include for-profit firms, particularly firms that traditionally have not done business with the Government. [Ref. 28:p. 2]

a. Policy

Under its 1997 Supplement, DDR&E established a three-prong policy to encourage the Services to use the flexibility granted by 10 U.S.C. 2371 to reduce the

administration burden, to craft innovative agreements and to request waivers of regulatory requirements if necessary. [Ref. 28:p. 2]

DDR&E strongly encourages the Military Department and DARPA to:

- Use flexibility in statute, codified regulation, and the 1994 DDR&E guidance to reduce Government-specific administrative requirements for assistance instruments.
- Use "other transactions" authorized by 10 U.S.C. 2371 to develop innovative approaches to carrying out research projects.
- Promptly seek waivers of regulatory requirements, if necessary. [Ref. 28:p. 2]

Consistent with this policy, DDR&E established TIAs. DDR&E's objective in creating TIAs was to alleviate the confusion associated with OTs and increase its use. [Ref. 28: p. 2]

b. TIA Guidance

TIAs replace two instruments: consortium agreements, a type of OT used by DARPA, and "flexible" cooperative agreements used by the Military Departments. [Ref. 28:p. 2]

DDR&E authorizes and encourages agreements officers, those authorized to award TIAs, to tailor the TIA to attract non-traditional firms in participating in defense research. [Ref. 28:p. 2] TIA guidance identified four principal factors to consider in using TIAs: nature of the project, type of recipient, cost-share valuation, program management involvement. [Ref. 28:pp. 5-8] The guidance required the project to advance or support research. TIAs were limited to for-profit firms. The recipients were expected to contribute meaningful resources to the project. The final factor to consider

was the level of program management involvement. TIAs would require more involvement on the part of program management than a FAR-type contract. [Ref. 28:pp. 5-8]

2. DDP Guidance

DDP is responsible for developing, interpreting and publishing procurement policy for DoD. [Ref. 32] DDP has cognizance for overseeing DoD's implementation of OTs for prototype projects. DDP recently issued draft guidance on prototype OTs. As with DDR&E, DDP is in the process of formalizing its guidance. [Ref. 33]

The guidance is less of a "how-to guide" and more of "what-to-consider" guide. It addresses, in 16 pages, many of the things contracting officers consider under FAR-type contracts: acquisition planning, price reasonableness, allowable costs, financial reporting, performance management, terminations, changes, disputes, protests, patent rights, and Government property. [Ref. 34] Much of the guidance provided by DDP is not unique to prototype OTs and could be considered for research OTs.

One significant difference between prototype and research OTs, however, is the requirement for prototype OTs to develop an acquisition plan. Prototype OTs do not provide authority to enter into production. A standard procurement contract must be used during the production phase. A prototype OT should not be considered without an Acquisition Strategy outlining the transition from an OT to a standard procurement contract. [Ref. 34:p. 4] Acquisition planning should also include issues such as sustainment; test and evaluation; and competition. [Ref. 34:p. 4]

3. Model Agreements

To assist in crafting an OT, model agreements have been developed for both research and prototype OTs. Rather than recreate them in this thesis, this researcher recommends reviewing Howell's thesis, Appendix A for a Model Research OT Agreement and Slade's thesis, Appendix B for a Model Prototype OT Agreement.

Models only provide a starting point in developing an OT. Each OT has unique requirements that must be considered in crafting an effective agreement. The agreements officer must use sound judgment and risk management to determine what to include and not include in the OT.

By issuing guidance, instead of regulations, DDR&E and DDP are empowering the decision-makers. DDR&E's policy for research OTs encourages flexibility, innovation and inquisitiveness. DDP's policy for prototype OTs is straightforward and concise. Both policies were intended to encourage increased and consistent use of OTs by the Services. Agreement officers, with the guidance, models and their judgment, should be able to create an effective OT agreement.

G. SUMMARY

DoD is operating in an environment characterized by unknown adversaries, rapid technological change and a shrinking or flat defense budget. To operate effectively in this environment, DoD must recognize the changes and adapt to them. The source for technical innovation is the commercial sector. To maintain technical superiority over its potential adversaries and do it affordably, DoD must find access into the commercial industrial base.

The use of OTs provides one solution into the commercial industrial base. Congress established OTA to provided DARPA and the Services maximum flexibility to pursue research and development efforts with commercial industry without the traditional Government contracting rules and regulations. This freedom has allowed DARPA and the Services to negotiate IPRs, to attract firms that traditionally do not do business with the Government and to influence commercial R&D and prototype efforts into dual-use technologies. Dual-use technology, as demonstrated in ACTD and COSSI programs, provide the warfighter better performance at reduced cost. However, this freedom also introduces risks to the process by permitting IPRs to be negotiated away and allowing both parties to unilaterally terminate for convenience.

The decision process on when to use OTA must weigh both the benefits and the risks of OTs. The decision-maker has been provided guidance and models on how to use this authority for both types of OTs, but ultimately the decision-maker must exercise sound judgment and protect the interests of the Government. The decision process is explored in the coming chapters. Chapter III discusses decision model theory and identifies three decision models: the Rational Decision Model, the Descriptive Decision Model and Contract Type Selection.

III. DECISION MODELS

A. INTRODUCTION

The purpose of this chapter is to provide the reader with background information on decision-making processes. This chapter presents three theoretical decision models. First, it discusses a Rational Decision Model and identifies six principal steps in the decision process. Next, a Descriptive Decision Model is considered. It builds on the Rational Decision Model by introducing the human element to the decision process. The final part of the chapter discusses the decision process for selecting contract type at Government buying commands. This decision model narrows the scope of the discussion to Government procurement. A discussion of each theoretical model follows.

B. RATIONAL DECISION MODEL

The purpose of theoretical decision models is to assist managers in understanding the decision process and how the decision-maker interacts with the process. [Ref. 35:p. 114] The Rational Decision Model prescribes how a rational decision-maker *should* decide. [Ref. 36:p. 4] To establish a level of understanding on the part of the reader, the researcher defines the terms rational and decision. Rational, as defined by Webster 3rd New International Dictionary, is having reason or understanding. Decision, as defined by the same source, is a determination arrived at after consideration. The Rational Decision Model, as shown in Figure 3.1, defines an optimal decision process. Six steps have been identified in the decision process: (1) Define the Problem; (2) Identify the criteria; (3)

Weigh the criteria; (4) Generate alternatives; (5) Rate each alternative; and (6)Compute the optimal solution. [Ref. 36:p. 4]

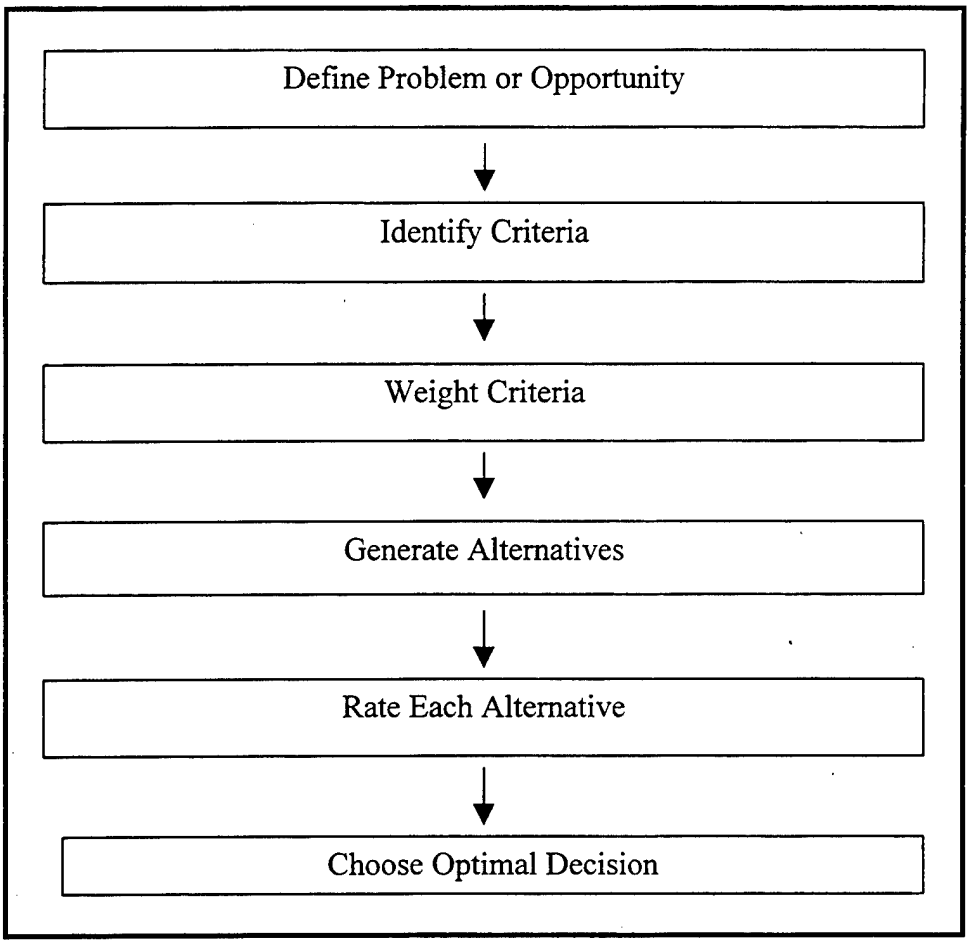


Figure 3.1. The Rational Decision Model [Ref. 36:p. 4]

1. Define Problem or Opportunity

First, determine what is the problem or opportunity. The remaining steps in the decision process rely on correctly identifying the problem. Incorrect identification will lead to a poor decision or the wrong decision. [Ref. 36:p. 4] Too often, individuals

identify the problem through the proposed solution, overlooking the big problem or identifying symptoms to the problem rather than the problem itself. [Ref. 36:p. 4]

2. Identify Criteria

Individuals generally have more than one objective when making a decision. [Ref. 36:p. 4] For example, a homebuyer would not consider just the price of the house, but also many other criteria, such as location, quality of the schools, quality of the house, proximity to work, etc. in making the purchase decision. In a Rational Decision Model, the decision-maker will identify *all* relevant criteria. [Ref. 36:p. 4]

3. Weight Criteria

After identifying the relevant criteria, decision-makers must determine the appropriate value for each criterion. The weighting of the criteria is dependent on the decision-maker's objectives. [Ref. 36:p. 4] To continue with the house example, a homebuyer, who is single and affluent, places a higher value on the quality of the home and the neighborhood than on the quality of the schools. Therefore, the homebuyer would weigh more heavily the quality of the home and the neighborhood. A rational decision-maker will know the relative value of each criteria identified. [Ref. 36:p. 4]

4. Generate Alternatives

The next step is to identify possible courses of action. [Ref. 36:p. 4] Decision-makers should invest as much time as possible exploring alternatives. This process is often curtailed too early because decision-makers feel time pressures, perceived or otherwise, to make a decision. [Ref. 36:p. 4] By not devoting sufficient time to identify alternatives, the decision-maker may not identify the optimal solution. A rational decision-maker will identify all relevant alternatives. [Ref. 36:p. 4]

5. Rate Each Alternative

Each alternative will most likely have both positive and negative aspects. [Ref. 37:p. 108] The decision-maker must evaluate how each alternative meets the prescribed criteria. A rational decision-maker will accurately determine the effects of each alternative on the prescribed criteria. [Ref. 36:p. 4]

6. Choose Optimal Decision

Finally, a decision will be made based on the information generated from the previous five steps. The alternative with the highest expected value would be the optimal decision. [Ref. 36:p. 4] The rational decision-maker will accurately calculate the expected value and will select the alternative with the highest expected value. [Ref. 36:p. 4]

"The Rational Model prescribes how a decision *should* be made rather than how a decision *is* made." [Ref. 36:p. 5] For the Rational Decision Model to work, decision-makers are assumed to:

1. Define the problem perfectly.
2. Identify all criteria.
3. Precisely weight all criteria.
4. Know all relevant alternatives.
5. Accurately assess each alternative.
6. Correctly calculate and choose the alternative with the highest perceived value. [Ref. 36:pp. 4-5]

The Rational Decision Model provides a theoretical framework for optimal decision-making. However, decision-makers do not operate in a vacuum, but in an

environment with internal and external influences that shape their decisions. [Ref. 37:p. 106] The next part of this chapter examines how human rationality and the environment affect decision-making.

C. DESCRIPTIVE DECISION MODELS

Descriptive decision models describe *how* decisions are made. Economist Herbert Simon, in his 1957 Nobel prize-winning work, suggested that individuals are bounded or limited in their rational capability. [Ref. 36:p. 5] Individuals are rational beings with the capability to make decisions, but are limited by their finite intelligence, memory and perceptive ability. [Ref. 36:p. 5] These limitations prevent decision-makers from making optimal decisions. [Ref. 36:p. 5] Yet, they make decisions in complex situations and environments. Research by Kahneman and Tversky (1979) suggest that individuals apply rules of thumb, or heuristics, in making decisions. [Ref. 36:p. 6] Heuristics allow decision-makers to cope with complexity in the decision environment. [Ref. 36:p. 6] A brief discussion follows on the use of heuristics and factors that affect decision-making.

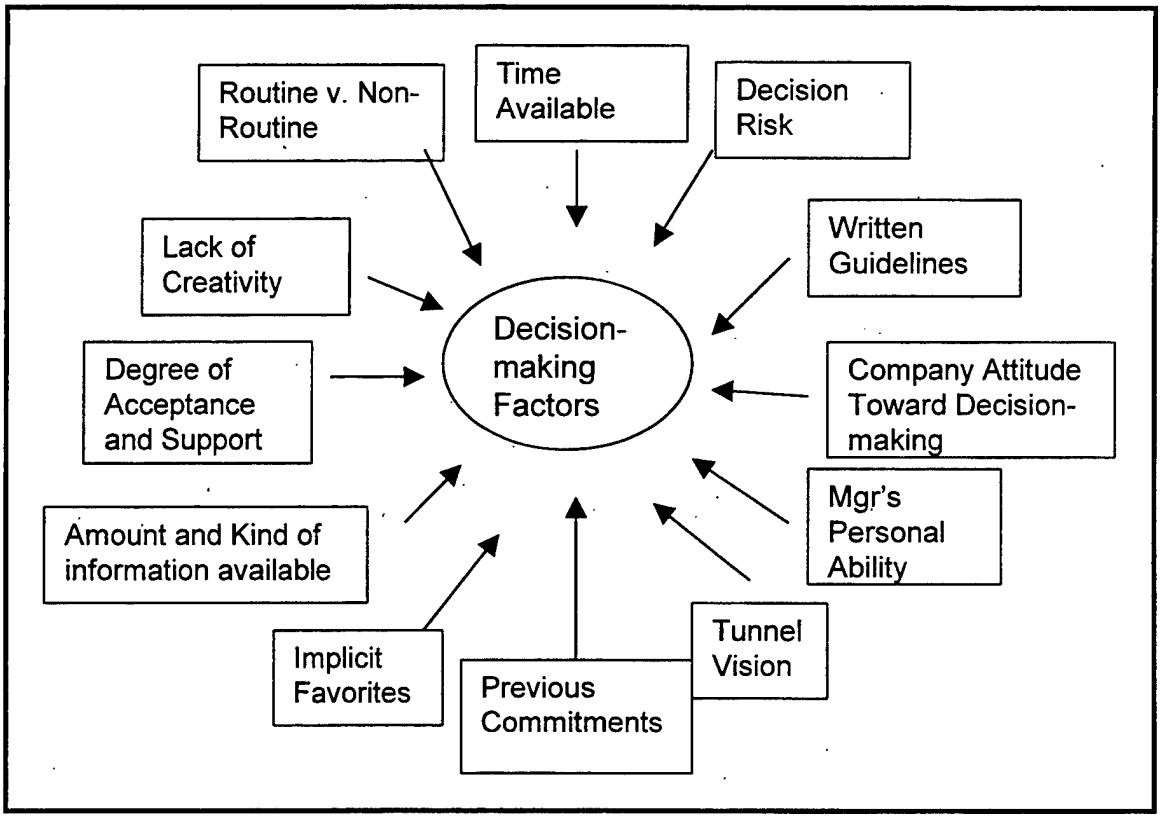
1. Heuristics

Mintzberg, in a 1975 study of managerial behavior, found that managers tend to rely on their intuition rather than hard, analytical data to make decisions. [Ref. 36:p. 6] As managers gain experience, they develop heuristics, based on their experiences to guide their decision-making. [Ref. 36:p. 6] Heuristics are helpful as a mechanism for coping with a complex environment, but their use can also bias the manager's judgment and result in making the wrong decision. [Ref. 36:p. 7] In an environment undergoing tremendous change, the use of heuristics could guide managers in the wrong direction.

Managers may need to approach decisions differently than they have in the past. [Ref. 37:p. 115] Managers must be aware of the limitations of decision-making biases on prior experience.

2. Factors Affecting Decision Making

There are many factors that affect the decision process in an organization. Some of the major factors influencing managerial decision-making are shown in Figure 3.2. The researcher has selected nine of these factors for discussion. The researcher introduces two other major factors influencing managerial decision-making into the discussion: framing and environmental influences.



Source: [Ref. 37:p. 111].

Figure 3.2. Routine versus Non-routine Decisions

Routine decisions are decisions managers make in the performance of their duties, generally governed by an organization's policies and the managers' preferences. [Ref. 37:p. 111] Non-routine decisions are decisions by managers to address unusual problems or situations. [Ref. 37:p. 112] Managers are responsible for making both types of decisions. However, non-routine decisions generally require managers to devote more time to evaluate the decision and require managers to think outside an organization's governing policies and regulations, by exercising creativity and good judgment. [Ref. 37:p. 112]

a. Time Available

The time available for decision-making is a critical factor in the decision process. [Ref. 37:p. 113] As noted earlier, managers often feel time pressures, perceived or real, to make decisions. Before making a decision, managers should consider the importance, urgency and risk of the decision. [Ref. 37:p. 129] Urgent decisions require rapid analysis. For important and/or risky decisions, managers should take sufficient time to carefully evaluate alternatives and not rush to a decision. [Ref. 37:p. 129]

b. Risk Associated with the Decision

Decisions all contain a level of risk. The magnitude of decision risk is dependent on how much an incorrect decision adversely impacts an organization. [Ref. 37:p. 113] Managers should consider the risks of a decision prior to making that decision.

c. Written Guidelines

Organizations provide differing levels of guidance for their managers to follow. Larger organizations tend to be more structured, with more written policy and guidance, than smaller organizations. [Ref. 37:p. 113] The degree of written guidelines by an organization can constrain the decision process. [Ref. 37:p. 114]

d. Company Attitudes Toward Decision Making

Organizations also differ in how they make decisions. Some organizations have a very structured or systematic decision process, while others are less formal. [Ref. 37:p. 114] Managers must understand their organization's attitude toward decision making so their decision process is in line with management's expectations. [Ref. 37:p. 114]

e. The Manager's Personal Ability as a Decision Maker

The manager's personal ability as a decision-maker is one of the most, if not the most, important factors affecting decision-making. [Ref. 37:p. 115] Mintzberg found that managers often rely on their intuition or judgment rather than hard data to make decisions. Managers must be careful when they use their experiences to guide their judgment because their experiences could lead to faulty decisions. [Ref. 37:p. 115] Some shortcomings with using experiences to guide the decision process are:

(1) Learning from experience is usually random.

(2) Although we may have experience, there is no guarantee that we have learned from it.

(3) What we learn from experience is necessarily circumscribed by the limits of our experience.

(4) Conditions change, and the past may not be a good indicator of current or future conditions. [Ref. 37:p. 115]

Experience is helpful in the decision process, but managers must draw on their intelligence and resources within their organizations to improve their decision processes. [Ref. 37:p. 115]

f. Tunnel Vision

Tunnel vision is seeing a situation with mental blinders that restrict, consciously or unconsciously, the number of alternatives to be considered. [Ref. 37:p. 116] Managers impose individual biases that may result in excluding worthwhile alternatives. [Ref. 37:p. 116]

g. Previous Commitments

Decisions generally are sequential in nature, in that, they build on prior decisions. [Ref. 37:p. 116] Decision-makers find it difficult to view the current decision independent from prior decisions. This tendency escalates the current decision and makes it difficult to say no. [Ref. 37:p. 116]

h. Implicit Favorites

Managers have to be careful not to favor an alternative too early in the decision process. By favoring one alternative over others, the manager may subconsciously downplay the attributes of the other alternatives and reject a better solution. [Ref. 37:p. 116]

i. Framing

Framing is the presentation of information. [Ref. 36:p. 48] In this part, the researcher will discuss how framing affects behavior. Prospect theory, developed by Kahneman and Tversky (1979), suggests that individuals change their behavior based on how the problem is framed. [Ref. 36:p. 55] Prospect theory repeals the theories of Expected Value and Expected Utility. Expected Value Theory suggests that an individual should select the alternative with the highest expected value. [Ref. 36:p. 52] Expected value is calculated for each alternative by summing up the product of the weighted outcomes and associated probabilities. [Ref. 36:p. 52] Expected Utility Theory suggests that an individual should select the alternative with the highest expected utility. [Ref. 36:p. 54] Expected utility departs from expected value because it recognizes that individuals place varying degrees of pleasure on each level of outcome. [Ref. 36:p. 54] Contrary to expected utility theory and expected value theory, how you frame the problem can shape the alternative selected. Both theories suggest that decision-makers would be indifferent to the framing of choices. [Ref. 36:p. 57] Prospect theory demonstrated that individuals are risk seeking in situations framed in terms of losses, and risk adverse in situations framed in terms of gains. Therefore, managers must consider the impact of framing in the decision process.

j. Internal and External Environment

The final factor discussed in this chapter is the influence the environment, both internal and external, has on managers' decision-making. Within the internal environment, decision-makers must consider the firm's mission, corporate culture,

management style of upper managers, policies, employees and unions before making decisions. [Ref. 37:p. 58] The external environment is equally complex, requiring managers to consider the labor market, legal and political factors, competition, customers and technology in their decision process. [Ref. 37:p. 58] By understanding and considering the environment inside and outside the organization, managers can make better decisions.

The purpose of both the Rational and Descriptive Decision Models is to describe the managers' decision-making process. The Rational Model describes the optimal decision process, while the Descriptive Model describes a decision process that recognizes the limitations of decision-makers, both physically and mentally. Understanding the process and how the decision-makers interact within the process, can improve their decision-making and lead to better decisions. Decision-makers should use decision models as theoretical frameworks to translate theory into practice. The next part of the chapter discusses the how contract type is selected.

D. CONTRACT TYPE SELECTION

The purpose of this part is to familiarize the reader with the decision processes at Government buying commands, specifically the decision process of selecting contract type before considering the decision process for OTs. Two areas are discussed: types of contracts and decision criteria for selecting contract type.

1. Types of Contracts

There are two basic types of contracts: fixed-price and cost-reimbursement type contracts. [Ref. 38:p. 213] A fixed-price type contract is an agreement between a buyer and supplier, where the buyer is obligated to make payment based on a price agreement between both parties, and the supplier is obligated to successfully perform within the terms of the contract. [Ref. 38:pp. 212-4] There are several fixed-price type contracts available to Government buying commands, including: firm-fixed-price, fixed-price-incentive, fixed-price-redeterminable, fixed-price with economic price adjustment provision, fixed-price-level-of-effort-term and fixed-price-incentive contract with multiple incentives. [Ref. 38:p. 212] In fixed-price type contracts the supplier bears most of the financial risk of non-performance. [Ref. 38:p. 214] Along a financial risk spectrum, firm-fixed-price contracts represent the most risk for a supplier, where the supplier is responsible for successful performance, without adjustments to the contract. [Ref. 38:p. 212] If a fair and reasonable price can be established; and the requirement is well defined, then the Government buying command should select a firm-fixed-price contract. [Ref. 39:p. 13]

Fixed-price contracts are generally the most preferred as they share a common element; the contractor guarantees performance of the contracted work as a condition for being paid by the Government. [Ref. 39:p. 10]

The second basic type of contract is a cost-reimbursement type contract. A cost-reimbursement type contract is an agreement between the buyer and the supplier that the buyer will reimburse the supplier for all allowable and allocable costs in the performance of the contract. [Ref. 38:p. 213] There are several types of cost-reimbursement type

contracts, including: cost-plus-fixed-fee, cost-plus-incentive-fee, cost-plus-award-fee and cost sharing type of contract. [Ref. 38:p. 214]

Cost-reimbursement type contracts differ from fixed-price type contracts because the supplier is only obligated to apply his best efforts in the performance of the contract. [Ref. 38:p. 214] The buyer, in this case the Government buying command, assumes a larger share of the financial risk of non-performance. [Ref. 38:p. 214] Cost-reimbursement type contracts should be used when costs to perform the contract cannot be estimated with a degree of certainty (e.g. research projects; concept exploration; development and testing). [Ref. 39:p. 10] A discussion of the decision criteria used in selecting contract type follows.

2. Decision Criteria

For sealed bid procurements, Government buying commands are required to use either firm-fixed-price type contracts or fixed-price contracts with economic price adjustment provisions. [Ref. 16:Part 16.102] However, for negotiated procurements, Government buying commands are provided broad discretion in selecting an appropriate contract type, as long as the Government's interests are promoted. [Ref. 39:p. 3] The remainder of this part focuses only on negotiated procurements.

Selecting a contract type is more than following a checklist. There is no simple formula for selecting the correct contract type for every circumstance. [Ref. 39:p. 3] Selecting the appropriate contract type requires judgment and expertise on the part of the Procuring Contracting Officers (PCOs) to evaluate the risks involved with the procurement and to encourage the supplier to perform efficiently and effectively. [Ref. 39:p. 7]

Selection of the best contract type will (1) provide for a reasonable allocation of risk between both parties, and (2) ensure that the contractor has the maximum incentive to reduce costs and also to comply with the terms of the contract. [Ref. 39:p. 7]

Figure 3.3 provides a flow chart of the steps involved in selecting contract type. The model identifies eight steps in the process:

1. Analyze Market Research.
2. Perform Risk Analysis.
3. Estimate Risk Impact on Cost.
4. Select Basic Types of Contracts.
   - For Fixed-price contracts, go to step 5
   - For Cost-reimbursement contracts, go to step 7
5. Select method of ordering.
6. Select pricing arrangement.
7. Select fee arrangement.
8. Document the File. [Ref. 39:p. 4]

a. Step 1: Analyze Market Research

Market Research is a process by which you actively collect, sort and evaluate information about a specific industry, product, commodity or commercial entity to make better procurement decisions. [Ref. 40:p. 39] Market research involves an ongoing, continuous study of the marketplace. Some of the benefits of market research are:

- Identify potential qualified vendors.
- Determine alternate sources of supply.

- Establish fair and reasonable prices.
- Refine user's statement of work. [Ref. 41:pp. 44-5]

The PCO should evaluate the data from the market research to determine if the data support the use of a fixed-price contract. [Ref. 39:p. 5] As discussed earlier, the Government prefers fixed-price arrangements because the contractor is required to successfully perform the contract to receive payment from the Government. The market research data should indicate whether adequate price competition exists, whether industry has the capability to perform, what was their past performance record, and if fixed-price arrangements are standard in this industry. [Ref. 39:p. 5]

b. Step 2: Perform Risk Analysis

An important element of contract type selection is the analysis of risk. Table III-1 identifies ten risk factors to consider in selecting contract type. PCOs should consider both the Government's and the contractor's exposure to risk, determining which are high and low. [Ref. 39:p. 5] By identifying the risk factors and risk exposure levels, PCOs can select the contract type that provides a reasonable allocation of risk for both the Government and the contractor. [Ref. 39:p. 7]

c. Step 3: Estimate Risk Impact on Cost

Of those factors that have been identified as high risk, PCOs should determine which of those factors will significantly impact the performance of the contract. [Ref. 39:p. 7] If no risks have been identified as high risk, the PCOs should determine if the aggregate impact of all the risks would have a significant impact on cost.

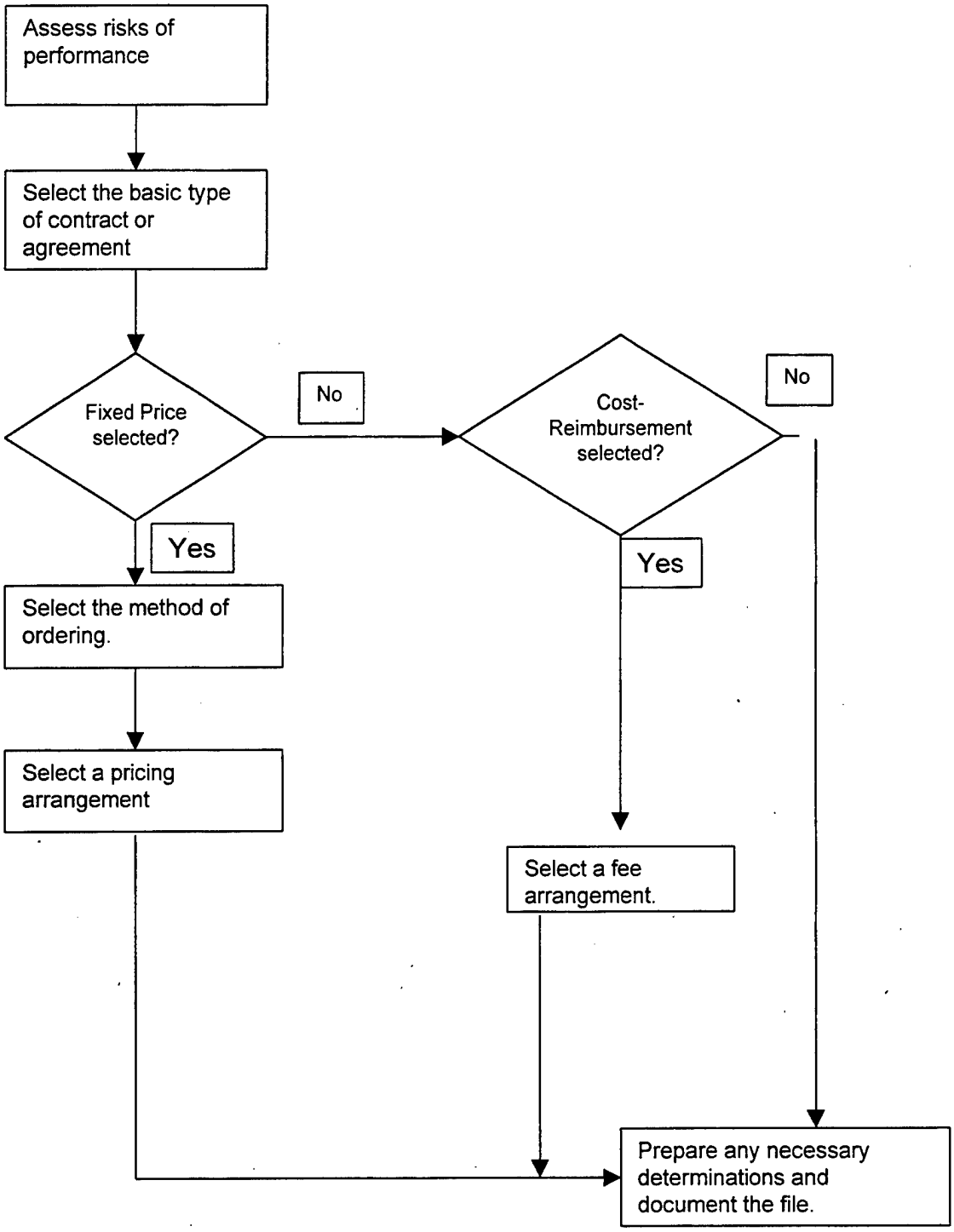


Figure 3.3. Steps In Selecting Contract Type [Ref. 39:p. 4-4]

[Ref. 39:p. 7] A firm-fixed-price contract should be selected if the aggregate risk is insignificant. However, if the aggregate risk is significant, other types of contracts should be selected. [Ref. 39:p. 7] The selection should be based on the level of uncertainty, the impact the uncertainty could have on the total cost of the contract and the cost of contract administration. [Ref. 39:p. 7] The objective of selecting contract type is not to place all the risk on the contractor, but rather, to reasonably allocate risk to both parties in order to achieve performance of the contract at a fair and reasonable price.

Table 3.1. Risk Analysis [Ref. 39:p. 6]

RISK ANALYSIS FAR 16.104		
FACTOR	Controlled By	ANALYSIS
Price Competition	Market	Effective price competition results in realistic pricing and a fixed-price contract is in the Government's interest.
Price Analysis	Government	With or without competition may provide a realistic pricing standard that would result in a fixed price contract.
Cost Analysis	Government	Uncertainties involved in performance and possible impact upon costs (labor, raw materials, plan and equipment, etc.) must be identified and evaluated so that a reasonable degree of cost responsibility upon the contractor can be negotiated.
Type & Complexity of Requirement	Government	Unique complex requirements usually result in greater risk assumption by the Government especially when performance uncertainties or the likelihood of changes make it difficult to estimate performance costs in advance. When a requirement recurs or quantity production begins, the cost risk should shift to the contractor and a fixed price contract should be considered.
Urgency of Requirement	Government	If urgency is a factor, the Government may assume a greater proportion of risk or offer incentives to ensure timely performance.
Period of Performance	Government	In times of economic uncertainty, contracts for a long period of time may require economic price adjustment terms.
Technical Capability/Financial Respons.	Contractor	Limited experience or need for capability or financial bonding or financial assistance responsibility may require closer Government surveillance than is provided by a fixed price contract.

Table 3.1 (Continued)

Accounting System	Contractor	Other than firm fixed price, the contractors accounting system should permit timely development of all necessary cost data. Required for FPI and cost reimbursement contracts.
Concurrent Contracts	Government	If performance under the proposed contract involves concurrent operations under other contracts, the impact of those contracts, including their pricing arrangements should be considered.
Approvals	Government	If performance under the proposed contract involves approvals by the Government at various stages (design, quality assurance, first article testing), then consider their impact.
Subcontracting	Contractor	If extensive subcontracting is proposed, actual risks to the prime contractor should be selected.

d. Step 4: Types of Contracts

Earlier discussion identified two basic types of contracts: fixed-price and cost-reimbursement type contracts. Fixed-price type contracts are the Government's preferred contracting type because it places the responsibility on the contractor for successful performance. However, there are circumstances when the costs to perform the contract cannot be estimated with a degree of certainty (e.g. research projects; concept exploration; development and testing). [Ref. 39:p. 10] In those cases, a cost-reimbursement type contract may be appropriate. If a fixed-price type contract is selected go to step five and select method of ordering. If a cost-reimbursement type contract is selected go to step seven and select fee arrangement.

e. Step 5: Select Method of Ordering for Fixed-Price Contracts

For fixed-price type contracts, the most frequently used method of ordering is a definite-delivery, definite quantity method. [Ref. 39:p. 12] The PCO has other options to consider under indefinite-delivery ordering methods, such as: indefinite-

quantity, definite-delivery; indefinite quantity, indefinite-delivery; and a requirements contract. [Ref. 39:p. 12] Indefinite delivery contracts allow: the buying activity to maintain minimum stock levels; the supplier to directly ship to the users; and flexibility in quantity and delivery requirements to meet the needs of users. [Ref. 39:p. 12]

f. Step 6: Select a Pricing Arrangement

After selecting ordering method, the PCO must consider the appropriate pricing arrangement. As identified earlier, there are many different types of fixed-price type contracts. The PCO should select the pricing arrangement that provides a reasonable allocation of risk for successful performance and incentive for the contractor to achieve or exceed specified performance goals. [Ref. 39:p. 13] The next step for fixed-price type contracts is step eight, documentation.

g. Step 7: Select a Fee Arrangement

Selecting a fee arrangement applies only to cost-reimbursement type contracts. Under a cost-reimbursement type contract, the contractor agrees to provide his best efforts to perform within the estimated cost. [Ref. 39:p. 19] In general, a contractor is reimbursed for all allowable costs. [Ref. 39:p.19] PCO should conduct a similar analysis of risk and incentives as conducted when determining pricing arrange-ment, to select the appropriate fee arrangement.

h. Step 8: Document the File

For both fixed-price and cost-reimbursement type contracts, the PCO must establish a contract file to document the decision process in selecting contract type. [Ref. 39:p. 24] For other than firm-fixed-price contracts, the PCO must assure the contractor's

accounting system is adequate because the PCO is obligating the Government to assume a portion of the cost of performance. [Ref. 39:p. 23] Documentation provides a written record of the obligations between the Government and a contractor and should stand-alone, in the absence of the PCO, as evidence of that obligation.

Government buying commands use two basic types of contracts: fixed-price and cost-reimbursement type contracts. The starting point in the decision process is assessing the risks of contract performance through market research, risk analysis and cost impact. The contract type selected should be one that provides a reasonable allocation of risk for successful performance and incentive for the contractor to achieve or exceed specified performance goals.

E. SUMMARY

In summary, this chapter described the decision-making processes in the Rational Decision Model, Descriptive Decision Model and Contract Type Selection.

The Rational Decision Model provides a framework for optimal decision-making. Six steps are identified in the process: (1) Define the problem, (2) Identify the criteria, (3) Weight the criteria, (4) Generate alternatives, (5) Rate each alternative, and (6) Compute the optimal choice. This Model provides an understanding of the basic steps in the decision process, but does not capture how decisions are actually made. The framework of the Rational Decision Model needs to be extended to recognize the human limitations of rationality. The Descriptive Decision Model makes this extension.

The Descriptive Decision Model recognizes the bounded nature of human rationality. Managers operate in a complex environment with finite, personal abilities. To operate in this environment, they often rely upon heuristics. Managers should recognize the limitations of heuristics, understand the factors influencing their decision-making and apply this knowledge to improve their decision-making. Managers are judged by how well they make correct decisions.

The final part of the chapter discussed the steps involved in selecting a contract type at Government buying commands. The contract type selected should be one that reasonably allocates the risks identified between the contractor and the Government and provides incentive for the contractor to achieve or exceed specific performance objectives.

All three models describe the managers' decision-making process. Understanding the process and how the decision-makers interact within the process, can improve their decision-making and lead to better decisions. Chapter IV presents the decision-makers in the OT process. The researcher interviews and analyzes the responses from Directors of Contracting, PCOs and legal counsel at DoD buying commands.

IV. DATA COLLECTION AND ANALYSIS

A. INTRODUCTION

The purpose of this chapter is to present and analyze the data collected in the personal and phone interviews. The chapter is presented in three parts. The first part discusses the intent of the interviews. Next, it describes the methodology of the interview process. The final part of the chapter presents and analyzes the data collected from the interview process.

B. INTENT OF THE INTERVIEW PROCESS

The purpose of the interviews was to provide sufficient data for the researcher to develop a generic decision model for DoD buying commands on when to use OTs. Directors, PCOs and legal counsel of DoD buying commands were the focus of the interviews. The researcher established five objectives in the interview process: (1) identify DoD buying commands' principal objectives of using OTs, (2) identify their principal decision criteria to use OTs over other contractual instruments, (3) rank the decision criteria in order of importance, (4) identify what barriers prevented or limited DoD buying commands from using OTs and (5) identify the organizational structure within the buying commands for authorizing OTs.

C. METHODOLOGY OF THE INTERVIEW PROCESS

Personal and telephone interviews were conducted with 43 acquisition professionals at ten DoD major buying commands and at positions of policy leadership

within DoD. The researcher interviewed twenty-five PCOs, eight Directors of Contracting and five legal counsels of DoD buying commands. The researcher also interviewed five personnel involved in OT policy within DoD. The DoD buying activities included Office of Naval Research (ONR); Naval Air Systems Command (NAVAIR); Naval Sea Systems Command (NAVSEA); Space and Naval Warfare Systems Command (SPAWAR); Naval Surface Warfare Center China Lake (NSWC-China Lake); Army Communications Electronics Command; Air Force Logistics Center, Sacramento; Defense Advanced Research Projects Agency (DARPA); National Imagery and Mapping Agency (NIMA); and Office of Special Projects (OSP). The DoD policy activities interviewed were Defense Research & Engineering (DR&E); Defense Procurement (DP); Assistant Secretaries of the Navy and Army for Research, Development and Acquisition (ASN (RDA) and ASA (RD&A)); and Air Force Material Command (AFMC). To generate frank and open dialogue in the interview process, the interviews were conducted on a non-attribution basis. The respondents participated voluntarily in the interview process and their contributions are greatly appreciated. A listing of the interview participants is presented in Appendix A.

D. INTERVIEW RESPONSES AND ANALYSIS

1. Principal Objectives for Using OTs

The researcher asked the respondents to identify their command's principal objectives in using OTs. The purpose of this question was two-fold: one, to identify the

primary objectives of using OTs at DoD major buying commands and two, to determine if there was consistency among the Directors, PCOs and legal counsel.

a. Data Presentation

The data are presented in Table 4.1. The columns in Table 4.1 represent the different constituencies within the Contracting Directorate: Directors, PCOs and legal counsel. The rows are the different objectives cited by these three groups. The objectives are ranked from the most to the least frequently cited objective. The data reveal a clear distinction between primary and secondary objectives.

The respondents identified four primary command objectives:

- Good business decision.
- Flexible terms and conditions.
- Attract non-traditional firms.
- Pursue dual-use technology.

Table 4.1. Principal Objectives in Using OTA

Reason	Director	PCOs	Legal	Total	%
Business Decision	8	12	4	24	63
Flexibility	4	12	3	19	50
Non-Traditional Firm	5	9	4	18	47
Dual-Use Technology	3	10	1	14	37
Improve Communication	1	5	1	7	18
Political	2	3	0	5	13
Streamline Process	2	2	1	5	13
Other	0	2	1	3	8
Total	25	55	15	95	NA

Source: Developed by Researcher.

There were 95 total responses by the 38 Directors, PCOs and legal counsel interviewed. The most frequently cited command objective for using OTs was that it be a good business decision. Of the 38 interviewed, 24, or 63 percent, cited this objective. The next most frequently cited objective was instilling flexibility in the acquisition process through the use of OTs. Nineteen of 38, or 36 percent, of those interviewed cited flexibility as a command objective. Attracting non-traditional firms was cited by 18 of 38, or 47 percent of the respondents. The last principal objective, pursuing dual-use technology, was cited by 14 of the 38, or 37 percent, of those interviewed.

Several other command objectives were also identified, but were cited less frequently than the four primary objectives and were classified as secondary.

- Improve dialogue between the program office and contractors.
- Streamline the acquisition process.
- Satisfy Political Pressure.
- Gain better insight into the technical capabilities of contractors.
- Reduce Operation and Support (O&S) costs.

These command objectives were cited by less than 20 percent of the respondents. Improving communication between the program office and contractors was cited by seven of the 38 respondents, or 18 percent. Using OTs to streamline the acquisition process was cited by five of the 38 respondents, or 13 percent. The next objective recognized the political influence encouraging use of this instrument. Satisfying political pressure was cited by 5 of 38 respondents or 13 percent. Some

respondents also identified gaining insight into the technical capabilities of contractors, thinking commercially and reducing O&S costs as other objectives of using OTs. These objectives were cited by three of the 38 respondents, or eight percent.

b. Discussion

As presented in Table 4.1, the Directors, PCOs and legal counsel identified four primary command objectives in using OTs: (1) be a good business decision, (2) instill flexibility in the acquisition process, (3) attract non-traditional firms and (4) pursue dual-use technology. Table 4.1 clearly shows a distinction between primary and secondary objectives. Table 4.1 also shows a shared perspective among the Directors, PCOs and legal in identifying the primary command objectives in using OTs. However, while the three perspectives were consistent identifying the principal objectives, the three perspectives differed in the ordering of these objectives. The next several paragraphs discuss each perspective.

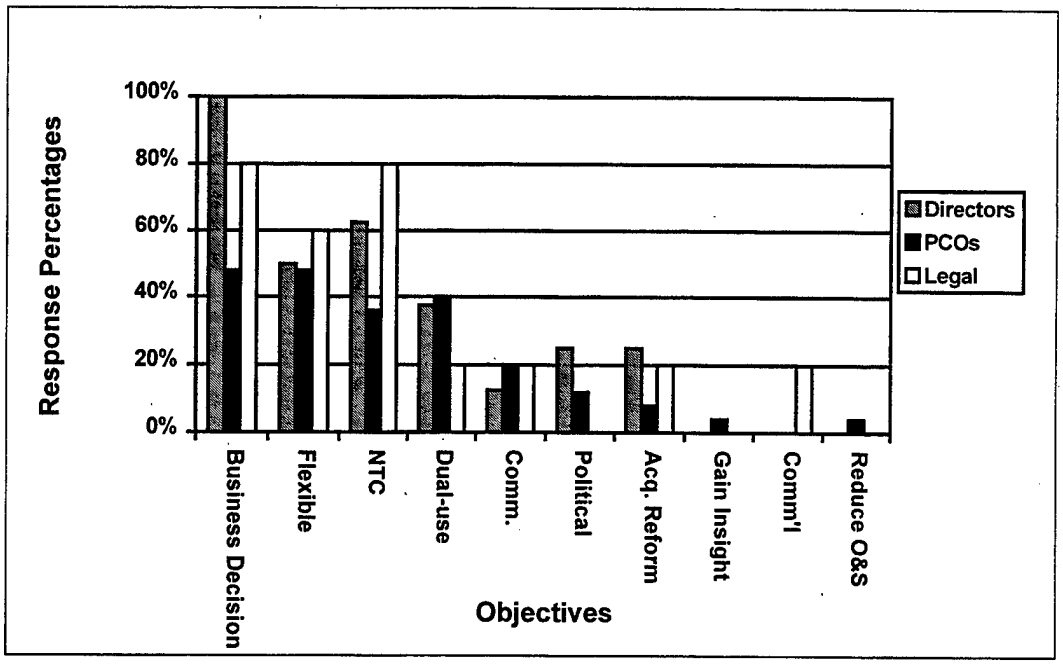
All Directors, or 100%, identified their primary command objective in using OTs was that it be a good business decision. Next, five of eight, or 62.5%, Directors cited attracting non-traditional firms as a primary command objective. Four of eight, or 50% of the Directors cited the flexibility in OTs in developing an agreement between the Government and contractors. To a lesser degree, Directors identified pursuing dual-use technology (37.5%), developing a closer relationship with contractors (37.5%) and improving communication between the Government and contractors (12.5%) as other objectives of using OTs. Directors also indicated politics influenced the decision to use OTs.

PCOs perceived the command's principal objective in using OTs was to achieve a good business deal. Twelve of 25 PCOs, or 48%, cited a good business decision as a primary command objective. PCOs equally cited flexibility provided by OTs to develop innovative agreements between the Government and the other party. Next, ten of 25 PCOs, or 40 percent, cited the pursuit of dual-use technology. The final principal objective, attracting non-traditional firms, was identified by nine of 25 PCOs or 36 percent. PCOs, to a lesser degree, indicated that other command objectives of using OTs were to improve communication (20%), to streamline the acquisition process (8%), to increase insight into the technical capabilities of contractors(4%) and to lower O&S costs (4%). Three PCOs, or 12 percent, also suggested politics influenced the decision to use OTs.

Four of the five legal counsels, or 80 percent, identified achieving a good business deal and attracting non-traditional firms. Three of the five, or 60 percent, cited flexibility as a principal objective. To a lesser extent, legal counsel cited other objectives which included: pursuing dual-use technology (20%), improving communication between the Government and contractors (20%), conforming to acquisition reform initiatives (20%) and thinking commercially (20%). Figure 4.1 is a graphical presentation of the responses provided by the three groups.

Figure 4.1 presents the Directors', PCOs' and legal counsel's principal objectives for using OTs. The x-axis represents the objectives: business decision, attract non-traditional firms (NTF), flexibility (flexible), dual-use, acquisition reform (Acq. Reform), political, improve communication (comm), gain insight into contractor's

capabilities, think commercially and reduce O&S costs. The y-axis represents the frequency of the responses for each objective.



Source: Developed by Researcher.

Figure 4.1. OT Objectives

c. Analysis

The researcher found there was consistency among the Directors, PCOs and legal counsel on what the command's objectives were for using OTs. Four primary command objectives to using OTs were identified by the respondents: (1) be a good business decision, (2) instill flexibility into a contractual relationship, (3) attract non-traditional firms and (4) pursue dual-use technology.

(1) **Good Business Decision.** All three groups identified the primary command objective of using OTs was that it be a good business decision for the Government. This objective is consistent with DoD's acquisition reform efforts to

empower DoD's acquisition professionals to use their sound business judgment, rather than prescriptive policies, to provide the best value goods and services to their customers. [Ref. 16:Part 1.102]

There is not a simple formula for determining a good business decision else all business decisions would be *good* ones. Rather, the determination relies heavily on the judgment of decision-makers. Decision-makers must identify and understand their objectives; identify and evaluate alternatives to achieve their objectives and select the best, or most appropriate alternative.

Within DoD buying commands, a good business decision considers what the customer wants and selects the best, or most appropriate instrument, to achieve that objective, while protecting the Government's interests. The use of OTs allow these buying commands greater flexibility to exercise their judgment in structuring a contractual arrangement with another party. OTs provide a flexible option to consider in the business decision. However, the use of OTs is not always an appropriate instrument and other instruments, such as contracts, grants or cooperative agreements should also be considered.

Although an OT is not a contract, a good business decision for the Government on the use of OTs should mirror some of the considerations made in selecting a contract type because both instruments aim to provide the best value to the Government. Some key areas to consider in selection of contract type were identified in Chapter III: market research, risk identification and risk analysis. Market research provides PCOs information on potential sources and industries' capabilities, and the

presence of adequate price competition. Risk identification reviews factors, such as price competition, price analysis, complexity of the requirement and urgency of the requirement, to determine which factors represent high risk to the Government. Risk analysis assesses those high-risk areas to determine their affect on cost or schedule performance. These areas provide pulse points for a PCO to consider in traditional acquisitions; however a PCO has to ultimately rely on personal judgment. These same areas could be considered in the OT decision process.

While an OT does share some similarities with a contractual instrument, OTs also have considerable differences. As discussed in Chapter II, the rules and regulations that apply for contracts, such as the FAR and DFARS, are not applicable to OTs. For example, both the Government and the contractors can terminate the agreement for convenience. The Contract Disputes Act does not apply. The terms and conditions of the agreement are negotiable. OTs require PCOs to rely on their judgment, even more than contractual instruments, because of its unstructured nature.

Is the requirement technically possible? Does the use of an OT make sense in this case? Is it being used for its intended purpose? To answer these questions, decision-makers must understand OTs, their benefits and associated risks. PCOs are not alone in this decision-process, but must use the expertise and judgment of legal counsel, Directors of Contracting and Program Managers (PMs).

Generally, OTs should be used to advance or support research and prototype efforts; OTs should not be used for production efforts. As identified in Chapter II, OTs are intended to increase DoD's access to advanced technology, particularly by

firms that traditionally do not do business with the Government; influence commercial R&D into dual-use R&D; and reduce DoD's life cycle costs for its weapon systems.

DoD buying commands should recognize that OTs can be useful instruments to better serve their customers, but OTs do not have universal application.

(2) **Flexibility.** The next most frequently cited command objective of using OTs was the flexibility OTs provided in structuring contractual arrangements. OTs provide flexibility to negotiate terms and conditions, patent rights and intellectual property rights. Of the three perspectives, PCOs felt the strongest about the flexibility OTs provided. The PCO's emphasis on flexibility may reveal a perception that the existing acquisition process does not contain sufficient flexibility. PCOs, not the Directors or legal counsel, are responsible for writing, negotiating and administering contracts. To do their jobs more effectively, PCOs need flexibility in the acquisition process.

OTs provide PCOs the ability to tailor the agreement and its terms and conditions, to achieve a beneficial arrangement between Government and the other party. OTs allow the Government to hold discussions with individual firms without the threat of protests. Absent this threat, both parties are able to hold frank discussions about the military requirements and the capabilities of the firm. With a better understanding on both sides, the end result is a better agreement.

The other two perspectives also identified flexibility as a principal command objective, but did not cite it as frequently, percentage-wise, as the PCOs. In fact, the Directors cited flexibility third, behind attracting non-traditional firms. One

respondent suggested that in his fifteen years of operational contracting experience, the FAR has never impeded him from accomplishing any objective. The Directors' lower assessment of flexibility suggests that the FAR may be more flexible than given credit for, particularly with the current FAR PART 15 rewrite.

Another reason for the disparity among the Directors, PCOs and legal counsel can be linked to their responsibilities. The Directors and legal counsel have much different responsibilities than the PCOs. The Directors are responsible for the overall contracting process for their buying activity and are interested in the business case. Legal counsel are responsible for advising PCOs and the Directors on how to protect the Government's interests. These different responsibilities shape their views on acquisition process. The Directors and legal counsel are not down in the trenches with the PCOs and would not share the same frustrations and limitations that confront PCOs.

(3) **Attract Non-Traditional Firms.** Attracting firms that traditionally do not participate in DoD business was the third most frequently cited command objective. This is consistent with the intent of the enabling legislation. The Directors and legal cited this objective second, behind the business decision, while the PCOs cited this objective as fourth, slightly behind the pursuit of dual-use technology.

All three perspectives stressed the importance of broadening the competitive base to improve technology and reduce costs. One respondent indicated that companies, such as 3M, Lucent, Motorola and Kodak were willing to do business with the Government if they used OTs. Another respondent indicated that through the use of OTs the Government was able to access all of the firm's business units, not just the four

Government business units it had in the past. The use of OTs permitted the Government to access the technological advances in the firm's commercial business units. As discussed in Chapter II, most of the technological advances are happening in the commercial sector, particularly by firms that do not participate in DoD business. To preserve technical superiority over potential adversaries, DoD has to find access into these firms.

By attracting firms that do not traditionally participate in DoD business, DoD is able to access new technologies and innovative business practices. If an OT is only attracting traditional defense firms, such as Lockheed Martin and Boeing, what new technologies and innovative business practices are you gaining from using an OT? Expanding the industrial base to include non-traditional firms provides DoD access to new technologies that are more readily available and less expensive. Competition from these smaller entities also should motivate the traditional defense contractors to improve their processes.

(4) **Pursue Dual-Use Technology.** The final primary command objective of OTs identified by the respondents was the pursuit of technology that had both a military and commercial use. PCOs, above the other two, cited this actually as their third most frequent command objective. Generally, PCOs interact with program management personnel more frequently than Directors of Contracting and legal counsel in the daily performance of their duties. With this closer bond, it is reasonable to see PCOs' perceptions are more in line with their Program Managers' (PMs) perspectives with regard to dual-use technology. PMs are required, by DoD 5000.2R, to explore

commercial solutions to fulfill their users' requirements. PMs are very interested in pursuing dual-use technology because it provides PMs with access to commercial technology for military application. In addition to increasing the technical capabilities of the system, commercial technology results in reduced cost because of production economies of scale and reduced risk because the technology has already been proven. [Ref. 15:p. 1]

The researcher believes that pursuit of dual-use technology should be a primary command objective of DoD buying commands because commercial technology can expand the alternatives available to the PM; alternatives that may increase performance, reduce risk or reduce cost. If PMs are unaware of the commercial technology available, the optimal solution to enhancing performance, to reducing risk or to reducing cost may be overlooked.

Four principal objectives of using OTs have been identified for DoD buying commands: (1) be a good business decision, (2) instill flexibility in the acquisition process, (3) attract non-traditional firms and (4) pursue dual-use technology. While the three parties diverged in the order of the objectives, the Directors, PCOs and legal shared a common perspective in identifying these as principal command objectives for using OTs. Commonality is important because all three parties, as well as the PM, will be involved in the decision process on when to use this instrument.

2. Principal Decision Criteria to Use OTs

The researcher asked the Directors, PCOs and legal counsel within DoD major buying commands to identify their command's principal decision criteria in selecting OTs

over other contractual instruments. The purpose of this question was to identify how these buying commands decided when to use OTs. It differs from question one because the intent of this question is to examine the OT decision process within these buying commands, not identify the buying commands' overarching objectives of using this instrument.

a. Data presentation

The data are presented in Table 4.2. The columns in Table 4.2 represent the Directors, PCOs, and legal counsel interviewed. The rows are the OT decision criteria identified by the respondents. The criteria are ranked from the most to the least frequently cited criterion. The data reveal a clear distinction between primary and secondary decision criteria.

The respondents identified five principal OT decision criteria:

- Reflect good business judgment.
- Attract non-traditional firms.
- Pursue dual-use technology.
- Nature of the project.
- Cost share arrangement.

There were 154 total responses by the 38 Directors, PCOs and legal counsel interviewed. The most frequently cited criterion in the OT decision process was that it reflect good business sense. Of the 38 interviewed, 26, or 68 percent, cited good judgment. The next most frequently cited criterion was that the OT enhance competition by attracting non-traditional defense contractors. 21 of 38, or 55 percent, of those

interviewed cited competition as a primary criterion. Pursuing dual-use technology was cited by 14 of 38 respondents, or 37 percent. The nature of the project was cited by 12 of 38 respondents, or 32 percent. The last principal criterion cited in the OT decision process was the cost-share arrangement, which was cited by 10 of 38 respondents, or 26 percent.

Table 4.2. Decision Criteria for When to Use OTs

	Directors	PCOs	Legal	Total	%
Business Judgment	7	14	5	26	68
Competition	4	14	3	21	55
Dual-Use Technology	3	10	1	14	37
Nature of the Product	2	7	3	12	32
Cost Share	2	8	0	10	26
Data Rights	1	2	3	6	16
Flexibility	1	3	1	5	13
COSSI $s	0	2	0	2	5
Gain Experience	1	0	0	1	3
Total	38	40	47	154	NA

Source: Developed by the Researcher.

Several other decision criteria were also identified, but were cited less frequently than the four primary ones. The researcher has classified these criteria as secondary:

- Data rights.
- Instill flexibility in the acquisition process.

- COSSI Program.
- Gain experience.

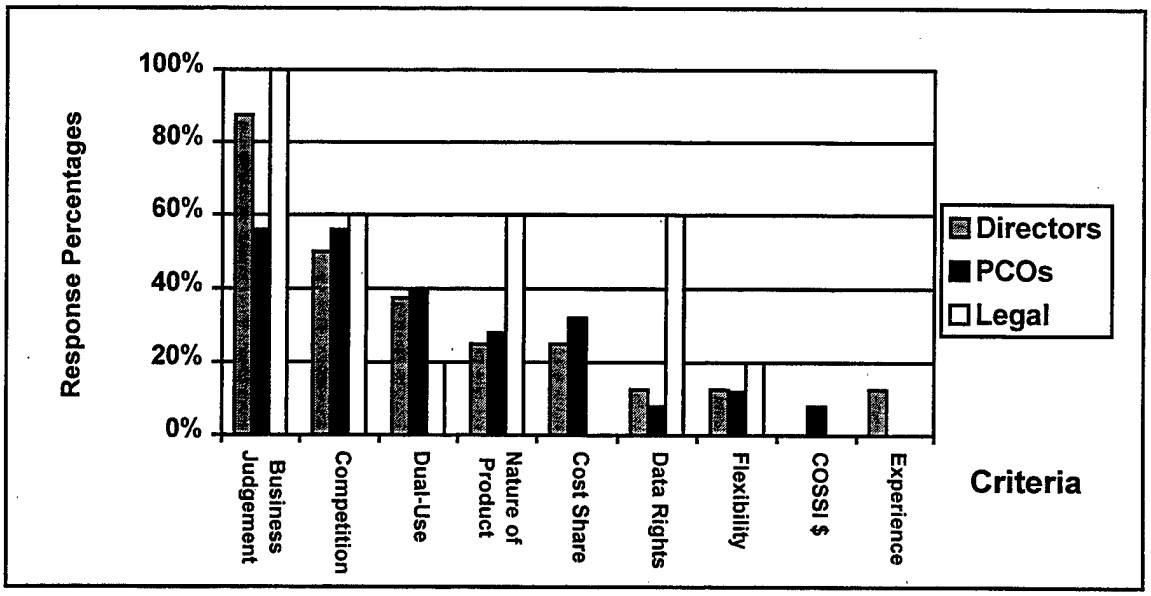
These secondary decision criteria were cited by less than 20 percent of the respondents. Data rights issues were cited by six of the 38, or 16 percent. Next, flexibility in the acquisition process was cited by five of 38, or 13 percent. The final two criteria identified by the respondents were to take advantage of the COSSI program and to gain experience.

Some respondents also noted that the decision to use OTs was often influenced by activities outside the contracting directorate. Dual-Use Science and Technology (DU S&T) Program, a branch of DDR&E, has determined at the outset that its projects will use either OTs or Cooperative Agreements. Some respondents have indicated that Resource Sponsors and PMs have exerted influence in the OT decision process. Even contractors, in their responses to Broad Agency Announcements (BAAs), have influenced the OT decision process by suggesting the use of OTs over other instruments.

b. Discussion

As presented in Table 4.2, the Directors, PCOs and legal counsel identified five principal decision criteria used in the OT decision process: (1) reflect good business judgment, (2) attract non-traditional firms, (3) pursue dual-use technology , (4) nature of the project and (5) cost share arrangement. Table 4.2 and Figure 4.2 show a

clear consensus among the three groups for the first two criteria, but less agreement over the remaining three criteria.



Source: Developed by Researcher.

Figure 4.2. OT Decision Criteria

The Directors, PCOs and legal counsel all identified business judgment and attracting non-traditional firms as their top two criteria in the OT decision process. The next three criteria, however, did not achieve that level of consensus. Dual-use, nature of the project and cost-share arrangement were, however, identified by the three perspectives frequently enough to be distinguished from the secondary criteria. The three perspectives did not share the level of consensus they had in identifying the command's principal objectives.

The identified criteria were very similar to the principal command objectives identified earlier. With the exception of flexibility, the three other objectives

coincide with the identified OT decision criteria. Intuitively, the decision criteria should be integrated with the command objectives in order to accomplish these objectives.

The identified decision criteria also were similar to the TIA guidance provided by DDR&E. Research OTs are a subset of TIAs. As discussed in Chapter II, DDR&E identified four factors that an Agreements Officer should consider in his TIA decision process: (1) nature of the project, (2) type of recipient, (3) recipient's cost share and (4) degree of involvement by Government program officials. Three of the four factors clearly correspond to OT decision criteria identified by the respondents. The fourth factor, degree of involvement by Government program officials, was not identified by the respondents, but may warrant consideration. This factor pertains to program management officials and not to Directors, PCOs and legal counsel and may explain why it was not identified. OTs do require more time on the part of program management than traditional research instruments through the attendance of quarterly reviews. [Ref. 18:Sect. V, p. 5] The PCOs should determine if program management personnel are aware of their increased level of involvement and are willing to accept their increased participation in their research project.

TIAs require more than traditional instruments [research contract or grant] on programmatic involvement before and during program execution...program officials will participate in recipients' periodic reviews of research progress and will be substantially involved with the recipients in the resulting revisions of plans for future effort. [Ref. 28:p. 4]

c. Analysis

The principal OT decision criteria identified by the respondents were: (1) reflect good business judgment, (2) attract non-traditional defense firms, (3) pursue dual-use technology (4) nature of the project, and (5) cost share arrangement. The five principal criteria are discussed in the following paragraphs.

(1) **Good Business Judgment.** Consistent with a primary command objective of using an OT, the first decision criterion identified by the respondents was that it reflect good business sense. The Directors cited business judgment more frequently in percentage terms than the PCOs, 88 percent compared to 56 percent. The disparity may be attributed to the fact that the Directors are responsible for approving OTs, while the PCOs are responsible for executing OTs. By being the approving authority within DoD buying commands, the Directors will be responsible for defending their decisions.

A good business decision will reflect good business judgment. The business decision within DoD buying commands considers what the customers want and selects the best, or most appropriate instrument, to achieve that objective, while protecting the Government's interests. Selecting an OT is only part of the business decision. The decision process for an OT should be an element that contributes to the business decision, but in and of itself, an OT is not a good business decision.

The use of OTs allow these buying commands greater flexibility to exercise their judgment in structuring a contractual relationship with another party, but it must be used appropriately. Decision-makers must exercise sound judgment, based on

experience and guidance, to determine that an OT is the appropriate instrument. The researcher believes that the business decision is the overall determinant in the OT decision process. All the other identified criteria should flow into making the business decision. The other criteria identified by the respondents should be a subset of the business decision. Depending on what the command is trying to achieve, whether it is to attract non-traditional firms, increase access to commercial technology or reduce cost of its weapon systems, will influence the business decision on when to use OTs.

(2) **Attracting Non-Traditional Defense Firms.** Broadening the DoD contractor base by attracting non-traditional defense firms is a major intent of the OT enabling legislation. The Directors (50%), PCOs (56%) and legal counsel (60%) identified attracting non-traditional firms as a principal criterion in the OT decision process. The business decision and enhancing competition were the only criteria to generate consensus among the three groups. A possible explanation for the level of consensus is the recognition of the commercial sector as the source of technological innovation.

In the past, military research and development defined state-of-the-art. Today that role has been assumed by the commercial sector, a sector that is no longer limited to the United States. A global industrial base has emerged; a global industrial base that DoD has to access to maintain technical superiority over potential adversaries and do so affordably.

DoD buying commands have been challenged by DUSD (A&T), Jaques Gansler, to become "world-class" buyers. [Ref. 12:p. 9] DoD can no longer rely

on an industrial base specialized in defense, but must expand its buying power into the global industrial base. The use of OTs provides one access point into the commercial industrial base by bringing down many of the barriers that are associated with doing business with the Government. GAO has shown that the use of OTs has attracted both non-traditional and traditional defense contractors. [Ref. 25:p. 5] For DoD to capitalize on the benefits of accessing the global market place, it must, as a "world-class" buyer, attract the best firms in commercial industry.

(3) **Dual-Use Technology.** The third principal criterion identified in the OT decision process was to pursue technology that could have both a commercial and military application. This criterion is consistent with the major command objectives of using OTs identified earlier. This criterion was cited by approximately 40 percent of the Directors and PCOs, but by only 20 percent of legal counsel. The respondents from DoD buying commands that performed predominantly research OTs placed a greater emphasis on dual-use technology as a decision criterion. The pursuit of dual-use technology appears to be more relevant in research OTs than in prototype OTs because research OTs are advancing or supporting commercial research, while prototype OTs are used to fulfill purely military needs.

(4) **Nature of the Project.** Next, the nature of the project was identified by 32 percent of the respondents as a principal criterion. This criterion is a "go, no-go" decision. The project must be a research or prototype project for an OT to be used. Within the OT decision process, it appears that this should be the first criterion to

be considered. The decision-maker cannot use an OT, unless the project meet this criterion.

The second step to consider under this criterion is to evaluate the intent of the project. For research OTs, the principal purpose is to support or stimulate research, not to acquire goods or services for the direct benefit of the Government.

Prototype OTs have a very different purpose than research OTs. For prototype OTs, the principal purpose of is to develop "prototype projects directly relevant to weapon systems proposed to be acquired by the Department of Defense." [Ref. 4] Prototype OTs are instruments that are for the direct benefit of the Government; they are used to fulfill a purely military need. COSSI and ACTD projects would be in this category of OTs.

The two types of OTs fulfill completely different objectives. Research projects using OTs are to advance research for everyone's benefit. On the other hand, prototype projects using OTs are specifically for the military's benefit. Through enactment of permanent legislation, Congress has loudly endorsed OTs used for research projects. Their endorsement of OTs for prototype projects has not been as vocal. An area that may warrant review is if these different objectives have had a dilution effect on the use of OT authority within DoD buying commands.

(5) **Cost-Share Arrangement**. The final principal criterion identified by the respondents was the cost-share arrangement between the Government and the other party. In line with DDR&E guidance, the respondents indicated that cost sharing would be an important criterion in the OT decision process, particularly for those

conducting research OTs. DDR&E identified the recipient's level of cost-share as a significant factor in deciding if a research OT is appropriate. Firms have to use their own capital toward the project to demonstrate their commitment to the success of the project. If the firms are unwilling to commit a meaningful cost share, then the Government should re-evaluate the project. The firms are indicating, through their lack of commitment, that they do not strongly believe in the merits of the project. If there is no commercial viability for this project, then DoD should pursue other projects that hold more promise.

The legislative language in 10 U.S.C. 2371 requires, to the maximum extent practicable, that the recipient contribute, at least a 50 percent cost-share. No cost-sharing provision is found in Section 845, authority for prototype OTs. However, several PCOs that conducted prototype OTs, cited the cost-share arrangement as a major criterion in the OT decision process. Those PCOs indicated that the cost-share arrangement demonstrated a commitment on the part of the contractors and the potential for commercial spin-off application for the prototype. The FY97 COSSI also indicated that contractors were expected to share in the costs of Stage I. [Ref. 9:p. 16]

The five principal decision criteria used by DoD buying commands were: (1) reflect good business judgment, (2) attract non-traditional defense firms, (3) pursue dual-use technology, (4) nature of the project and (5) cost-share arrangement. The respondents had a clear idea of what the primary decision criteria should be for using OTs. How they ranked the decision criteria are discussed in the next part of the chapter.

3. Ranking of Decision Criteria

The purpose of this question was to determine if there is a hierarchy of criteria in the OT decision process. The question was directed to the PCOs.

a. Data Presentation and Discussion

The data are presented in Table 4.3. The columns in Table 4.3 represent the PCOs' responses, in numerical and percentage terms. The rows represent a ranking of the criteria from the most to the least frequently cited. The data reveal that a hierarchy of criteria for the OT decision process has not been established at DoD buying commands.

Table 4.3. Ranking of Decision Criteria

Criteria	PCOs	%
None	18	72
Non-traditional contractor	4	16
Acquisition Reform	1	4
Nature of Project	1	4
COSSI	1	4
Total	25	100%

Source: Developed by Researcher.

Of the 25 interviewed, 18 PCOs, or 72 percent, indicated that no ranking of criteria could be established.

Four reasons were identified:

- Each OT has to be reviewed individually.
- Insufficient number of criteria.
- Influence of BAAs.
- OT decision made outside DoD buying agency.

Twenty-eight percent of the PCOs believed they could rank the principal criteria in the OT decision process. The most frequently cited criterion was to attract non-traditional firms, identified by four, or 16 percent, of the PCOs. The remaining three PCOs identified acquisition reform, nature of the product and COSSI as their top decision criterion. In the analysis section, the researcher focuses on why a majority of the respondents felt that a hierarchy of criteria could not be established.

b. Analysis

The researcher found there was a general agreement among the PCOs that a ranking of OT decision criteria could not be established. Most prevalent, and in line with the business decision, was that each OT had to be evaluated on an individual case basis. Depending on what the command was trying to achieve with the use of an OT would determine what criterion would be more important.

Next, four of the PCOs were unable to determine a ranking of criteria because they only identified one criterion in their OT decision process. Two of the four respondents cited the Bayh-Dole Act patent requirements as their discriminator in the OT decision process. These PCOs used Cooperative Agreements extensively and saw an OT as a default instrument if it became necessary to negotiate patent rights. The other two cited COSSI funding as their criterion. The presence of COSSI funding permitted the activity to pursue a desired project if they would use an OT. Though only one decision criterion was cited there did exist a decision process, a "go, no-go" decision.

Another reason cited for not ranking the decision criteria was attributed to BAAs. The BAAs issued by DoD major buying commands generally specify that a

standard procurement contract, Cooperative Agreement or OT would be considered. The Government wanted to provide the contractors with maximum flexibility to determine the right instrument for them. Some of the respondents indicated that all contractors did not understand the distinctions between cooperative agreements and OTs. To effectively use OTs, both sides need to understand them. Educated in the benefits and drawbacks of using this instrument, contractors can intelligently indicate which instrument is appropriate. DoD buying commands, prior to submitting a BAA, must determine that an OT would be an acceptable instrument. When using BAAs, the decision process for when to use OTs is made before the BAA is issued.

The final reason cited for not ranking the OT decision criteria was that the decision was not the PCOs' decision to make. The decision was made outside the contracting directorate. Dual-Use Science and Technology (DU S&T) Program is one organization that makes the OT decision outside the contracting directorate. DU S&T has determined that its FY99 projects will use either a Cooperative Agreement or an OT. To accomplish its objectives of exploring dual-use technology and familiarizing the Services with using this instrument, DU S&T has made the OT decision up-front. The OT decision process should be placed where the decision is optimized, whether that is at the organization level, in the case of DU S&T, or within the contracting directorate. Each command will have make that determination on a case by case basis.

The respondents have clearly determined that there should not be a ranking of the OT decision criteria. The OT decision process should be treated on a case-by-case basis. However, there should be a starting point within the OT decision process.

The logical starting point of process is the nature of the project. If the project is not a research or prototype project, then an OT cannot be used. At this point; the other decision criteria are meaningless. If, however, the nature of the project is satisfied, then the relative importance of the other criteria will depend on the project. These decision criteria should form the basis of determining if an OT is an appropriate instrument for achieving the program objectives. The decision process is further explored in Chapter V. The next question identifies the policies and restrictions that limit the use of OTs at DoD major buying commands.

4. Barrier to Using OTs

The purpose of this question was to determine what barriers existed to using OTs and if they were internal or external to the buying command. The question was directed to Directors and PCOs.

a. Data Presentation and Discussion

The data are presented in Table 4.4. The columns in the table represent the Directors and PCOs interviewed. The rows represent the identified barriers to using OTs. The barriers are ranked from the most to the least frequently cited.

The researcher has classified the data into two groups: internal and external barriers. The data do not reveal a clear consensus on which barriers limit the use of OTs.

Table 4.4. Barriers to Using OTs

Barriers	Directors	PCOs	Total	%
None	1	9	10	30
Regulations	1	6	7	21
Unfamiliar	2	4	6	18
Production	0	5	5	15
Cultural Resistance	2	2	4	12
Prototype Defn.	1	3	4	12
Program Default Risk	1	2	3	9
Total	8	31	39	NA

Source: Developed by Researcher.

The respondents identified two internal barriers:

- Cultural resistance to change.
- Lack of familiarity with using OTs.

Four external barriers were identified:

- Regulations.
- Inability to use OTs for production.
- Prototype definition.
- Program default risk.

There were 39 total responses by the 33 Directors and PCOs. The five legal counsel were not interviewed. The most frequently cited response was that no barriers limited their use of OTs. Of the 33 interviewed, 10, or 30 percent, cited no barriers. The next most frequently cited response was that regulations, either statutory or guidance, limited their use of OTs. Seven of the 33 respondents, or 21 percent cited this

as a barrier. Unfamiliarity with an OT was cited by 18 percent of the respondents. The inability to transition from a prototype to production under an OT was cited by 15 percent. To a lesser degree the respondents cited cultural resistance to change, the definition of a prototype and program default risk, cited by 12 percent, 12 percent and nine percent respectively.

As presented in Table 4.4, the Directors and PCOs did not establish a clear consensus on major barriers to using OTs. For the reader to appreciate the different viewpoints, some of the responses are paraphrased below.

- No limitations. OTs have many uses and were never intended to be limiting.
- The new PMs do not have the experience or enthusiasm to use OTs. We have had to educate the new PMs on the use of OTs as a possible way of developing technology. PMs need to become involved in the decision process.
- ACOs initially were unfamiliar with OTs.
- OTs cannot be used for production efforts. The OT agreement must be converted to a FAR-type contract when it is time to transition into production. Contractors are concerned that their cost share investment in the prototype project will not carry over into the production phase because the contract gets competed out in phase II.
- OTs involve breaking down paradigms. People are creatures of habit, changing their behavior is difficult. Contracting Officers are particularly risk adverse, concerned about DCAA and DoDIG oversight. OTs require a change in behavior, a hard thing to do.
- There is a natural reluctance to change. Under a FAR-type contract, you know what you are getting. "Old-timers" have shown a particular reluctance to change.
- Acquisition Reform is supposed to change the way DoD does acquisition. Why is DoD using the old system? We have smart people at major

contracting agencies, why not use them and trust them to make good business decisions?

- What is the definition of a prototype? Does it have to be the first article of production? Virtual prototyping in the computer field could challenge the traditional idea of what is a prototype.

b. Analysis

(1) **No Barriers.** Ten of 33 respondents cited no barriers or restrictions limited their use of OTs. Due to the relative newness of this instrument within DoD buying commands, the researcher was surprised by this response. Authority to use OTs was delegated to DoD buying commands in 1996.

Reviewing the ten responses, nine were from small commands that engaged in cutting-edge technology and one was from a Major Systems buying command. The nine respondents saw OTs as another tool to support and stimulate technological activity, not as a limitation. These commands performed projects that could be described as high-risk, high-payoff projects. The culture at these commands differed considerably from DoD Major Systems buying commands. Small and flexible, these commands more readily embraced change and more heavily depended on the judgments of key acquisition personnel. The command culture found at the smaller buying commands appears to be the reason for identifying no barriers to using OTs.

(2) **Internal Barriers.** The respondents identified two internal barriers to using OTs: (1) cultural resistance to change and (2) lack of familiarity with using OTs. Resistance to change was cited by four of the 33 respondents. Does this low response refute the perception that Government employees are risk-adverse? Perhaps

asking someone if they are a risk-seeker or are risk-adverse, will provide one set of data and observing his or her behavior will provide a different set of data.

From Chapter III, risk-adverse behavior was found to be inherent in human behavior. "Individuals are risk-adverse and prefer certain outcomes of known behavior to uncertain outcomes of innovative behavior." [Ref. 36:p. 197] Changing behavior is difficult. OTs require a change a behavior within DoD buying commands. With its unstructured nature, OTs require decision-makers to rely more on their judgment than contractual instruments.

The second internal barrier identified was the lack of familiarity in the use of OTs. DoD buying commands have not done very many OTs to date. In a FY98 DoDIG Audit, DoD buying commands issued 149 OTs from FY94 through FY97. [Ref. 39:p. 5] Excluding DARPA, DoD buying commands issued only 61 OTs in three fiscal years. With so few issued, PCOs have not developed the requisite experience in using OTs. DU S&T wants to change that by exposing DoD buying commands to the use of OTs. Central to DU S&T objectives in using OTs is for the Services to gain experience and familiarity with OTs. For these reasons, DU S&T requires its FY99 Projects to be awarded using either OTs or Cooperative Agreements.

The use of OTs requires PCOs to learn a new process. Several respondents cited a large learning curve to using OTs. The PCOs no longer have the FAR "armor" to protect the Government's interests. PCOs have to rely on their judgment to think through what to include in an OT to achieve the business deal while protecting the Government's interests. For the use of OTs to be an accepted instrument within DoD

buying commands, the organizations have to become familiar with OTs. The researcher believes as DoD buying commands continue to use OTs the resistance to change and the lack of familiarity will be reduced.

(3) **External Barriers.** The respondents identified four barriers to using OTA external to the organization: (1) regulations, (2) inability to use OTs for production (3) definition of prototype and (4) program default risk. The first two barriers are related and refer to the enabling legislation for the use of OTs. The third barrier identifies some difficulties defining what is a prototype. The fourth barrier identifies the potential downside risk of the contractor defaulting and the Government receiving nothing of value.

Since the first two barriers are related, they are addressed together. Seven of the 33 respondents indicated that regulations limited their use of OTs. Five of 33 cited the production restriction. Of those that said the legislative restrictions limited their use, the respondents did not say that the barrier was positive or negative. The researcher believes that most of the respondents were simply stating the existence of statutory regulations for the use of OTs.

The production barrier, however, did generate comments from the respondents that indicated that it posed a negative barrier. One respondent, addressing the COSSI program, cited contractors' concerns of contributing resources in Phase I with the potential of not winning Phase II. Under the COSSI, Phase I is the development of prototype kits and Phase II production of the kits. When COSSI transitions into Phase II, the Government must convert the OT instrument into a FAR-type contract and solicit

for competition. DARPA has sought Congressional approval to extend OT authority to production to preserve the efficiencies achieved with OTs during the prototype project. Based on the FY99 Defense Authorization Bill, it is unlikely that Congress will expand the authority to include production. In this Bill, Congress cited concerns that DoD was not using OTA for prototypes responsibly and that DoD was skirting the acquisition system. [Ref. 20] It appears that these two barriers will remain intact for the foreseeable future.

The third barrier external to the organization is the difficulty defining what is a prototype. A prototype is defined in the DSMC Glossary of Acquisition Acronyms and Terms as an original or model on which a later system/item is formed or based. The purpose of prototyping is to test out a model or concept before investing considerable resources into production. [Ref. 43] Prototype allows the Government to reduce its program risk by testing the prototype in an operational environment- a "fly before you buy" concept. The definition of a prototype leaves a lot of room for interpretation. One respondent questioned whether a prototype has to be the first article of production. Another respondent elected not to use an OT because the prototype too closely resembled a Low Rate Initial Production (LRIP) case. Within the computer industry, the line of distinction between a prototype and production becomes even blurrier. One respondent called it "virtual prototyping". The rate of technological advances suggests the distinction between prototype and production will continue to narrow. Therefore, this barrier will remain.

The final external barrier identified by the respondents was program default risk. Program default risk is the risk that the contractor will default on the OT. OTs, unlike contracts, provide both parties the capability to terminate for convenience. [Ref. 18:Sect V, p. 7] If the contractor elects to terminate, the Government may have nothing of value to show for its expenditures.

The cost-share provisions in OT agreements may mitigate program default risk. Contractors in many cases are contributing substantial resources to engage with the Government in research and prototype projects. The contractors make their own business decision when they determine a project is worth pursuing. To default on an agreement, the contractors, in consultation with the Government, must assess that further commitment to the project outweighs the benefits to be derived from the project. Ending projects that do not have future viability are smart decisions for both parties. The Government needs to accept the fact that the project did not meet its objectives and move on to other projects with brighter prospects.

Command culture contributed to the identification of barriers to using OTs. Small DoD buying commands, predominantly performing R&D, identified no barriers to using OTs. While at the larger DoD buying commands, barriers, both internal and external, to the organization were identified. The primary internal barriers were: (1) resistance to change and (2) lack of familiarity with OTs. External barriers to the use of OTs were: (1) regulations, (2) inability to use OTs for production, (3) prototype definition and (4) program default risk. As OTs become more accepted at DoD buying commands, the internal barriers and program default risk should be reduced.

However, the three remaining external barriers: statutory limitations, production restrictions, and prototype definition, will remain. Based on recent Congressional language in the FY99 Defense Authorization Bill, no major changes easing the restrictions in the use of OTs are anticipated. The rapid, technological advances in the commercial sector, particularly in the computer field, have blurred the distinction between a prototype unit and a production unit.

5. Command Structure for Authorizing OTs

a. Data Presentation and Discussion

The purpose of this question was to determine what organizational structure was used by DoD buying commands in authorizing OTs. It is designed to determine if there was consistency among the DoD buying commands and if command culture had any impact in how OTs were authorized.

Ten of the ten DoD buying commands reviewed had similar organizational structures for approving and signing OTs. The approval authority rested with the Director or Deputy Director for Contracting. The Director or Deputy Directors in all cases delegated the execution of an OT to either a Branch Head or PCO.

b. Analysis

The researcher found consistency in the DoD buying commands' organizational structure for approving and signing OTs. Directors or Deputy Directors oversaw the business decision to ensure OTs were used appropriately, but delegated the actual execution to the PCOs or Agreement Officers. The organizational consistency

among DoD buying commands for OTs mirrors the judgment process used for FAR-type contracts.

The approval and execution process for OTs at DoD buying commands, particularly the larger buying commands, is very similar to the contracting process at these commands. In both cases, the Government is seeking to achieve the best value contract/agreement, while protecting the Government's interests. For procurement contracts, PCOs are required to submit Business Clearances for approval, documenting their decision process. In reviewing the Clearances, the Directors or Deputy Directors are looking at the business case.

For OTs, PCOs submitted a document to the Director, or Deputy Director, outlining why an OT would be the best instrument in this case and what benefits would accrue from the use of an OT. Some commands used a Determination and Findings (D&F), while others used a Business Decision Document (BDD), but the objective of making good business sense remained the same.

Smaller DoD buying commands did not have such a formal requirement in the business decision process. Often a discussion between the Directors, legal and the PCOs was sufficient to complete the process. Though the process is less formal, the major players are still involved in the decision process: Directors, PCOs or Branch Heads, legal counsel and sometimes the PM. This informal nature is consistent with the nimble structure of a research agency. The culture does impact the process of approving OTs. Smaller commands, such as DARPA or ONR, use less formal procedures, but the approval structure of involving the Directors, PCOs, legal counsel and PMs is the same

for all DoD buying commands. Each perspective needs to be included in the OT decision for the Government to achieve the best business deal.

E. SUMMARY

In summary, there is considerable consistency between the Directors, PCOs and legal counsel among DoD buying commands on what were their commands' principal objectives of using OTs. The principal objectives of using OTs are to: (1) be a good business decision, (2) instill flexibility in the acquisition process, (3) attract non-traditional firms and (4) pursue dual-use technology. If DoD buying commands have the same objectives in using this acquisition instrument, then their decision criteria and the decision process should also be fairly similar.

The identified principal decision criteria in deciding when to use OTs was, in fact, very similar to their command's objectives. The four principal decision criteria are: (1) reflect good business judgment, (2) attract non-traditional firms, (3) pursue dual-use technology and (4) nature of the project. Three of the four decision criteria matched up with the command objectives for using OTs. However, a ranking of criteria was not established at these buying commands. The researcher concludes that the business decision is the overriding determinant in the OT process. Within the OT process, nature of the project is the discriminator, determining whether or not an OT can be used. The relative rankings of the other criteria will depend on which projects are considered.

The decision process was nearly identical among the ten different buying commands. In all cases, the Directors or Deputy Directors of Contracts were the

approving authority for OTs. The PCOs were given the authority to sign the OTs and execute them. The only striking difference among the commands was the formal procedures in place at the Major Systems Commands and the informal procedures at the smaller buying commands. The formality of the process did not influence the decision process. The Directors, PCOs, legal counsel and PMs brought their perspectives and experiences together to achieve the best business decision.

The buying commands did identify barriers, external and internal, that limited their use of OTs. The internal barriers identified were cultural resistance to change and lack of familiarity with OTs. As these commands use OTs more frequently, these barriers will be reduced. The external barriers are outside the control of the buying commands and will most likely not be reduced in the near future.

Chapter V uses the data collected in this chapter with the decision framework provided in Chapter III to develop a decision model on when to use OTs.

V. THE OTHER TRANSACTION DECISION MODEL

A. INTRODUCTION

The purpose of this chapter is to apply the analysis from Chapter IV to the decision model framework identified in Chapter III to develop a decision model on when to use OTs at DoD buying commands. The chapter is presented in three parts. The first part discusses the intent of the OT decision model. Next, it considers the methodology of setting up the decision model. The final part of the chapter presents the decision model.

B. INTENT OF THE MODEL

Before discussing the intent of the decision model, it may be useful to first discuss, what is not the intent of the model. The model is not intended to be a step-by-step, or "cookbook," process that delivers a decision as the output. This type of model would correspond to a Rational Decision Model, which was discussed in Chapter III. The Rational Decision Model assumes that the decision-maker has perfect information; has correctly identified the problem; knows and has properly weighted all criteria; knows and has correctly evaluated all relevant alternatives; and selects the optimal solution. This type of model, though helpful in describing how decisions should be made, does not reflect how decisions are actually made.

In reality, decision-makers operate under imperfect conditions and have to make decisions without identifying all of the relevant criteria and alternatives. Decision-makers rely on their judgment, judgment that is shaped by experiences and heuristics, to overcome the imperfect conditions and to guide their decision-making.

The intent of this OT decision model is to identify factors, primary and secondary, for decision-makers to consider in their OT decision process and recognize influences, both internal and external, to the buying command. Depending on what the buying command is trying to achieve will determine which factors will be pertinent in the decision process. This model does not supply the "right" answer, but provides the decision-maker with a framework that identifies key factors that should be considered in determining if an OT is appropriate.

C. METHODOLOGY

The researcher reviewed the data provided by the respondents in Chapter IV to determine what type of model could be applied to the OT decision process. Would a prescriptive or descriptive model be more appropriate in this case? A prescriptive model describes how decisions should be made rather than how they are actually made as in a descriptive decision model.

From the literature review and the interviews, the researcher did not discover a pre-existing decision model on the use of OTs. Guidance was provided by DDR&E and DDP on the use of this instrument and was descriptive in nature. Both sets of guidance provided factors for the decision-maker to consider, rather than instructing the decision-maker how he should decide. The OT decision process relies heavily on the judgment of the decision-maker. By issuing guidance, instead of regulations, DDR&E and DDP are empowering the decision-maker and encouraging flexibility and innovation.

The descriptive nature of the guidance provided by DDR&E and DDP and the relative importance of judgment in the OT decision process led the researcher to conclude

that a descriptive decision model would be more appropriate than a prescriptive model. A descriptive decision model does not generally follow a linear pattern because there are different factors or influences affecting the decision process. Each OT brings a different set of circumstances to consider.

From the data in Chapter IV, it appears that the business decision is central to the OT decision. The other identified criteria and influences represent factors to consider in the business decision. The final part of the chapter presents the OT Decision Model.

D. DECISION MODEL

The OT Decision Model, presented in Figure 5.1, revolves around the business decision. The researcher developed a model that identifies five primary and six secondary factors that should be considered in the business decision. The model also identifies three internal and three external influences on the buying command that may affect the OT decision.

1. Primary Factors

The five primary factors identified in the model were discussed in previous chapters. Four of the five factors were derived from the data provided through the interview process in Chapter IV. The fifth factor was derived from the Contract Type Selection Model in Chapter III. The five primary factors to consider in the OT decision process are: (1) nature of the product, (2) non-traditional defense firms, (3) dual-use technology, (4) cost-share arrangement and (5) risk analysis. A discussion of each factor follows.

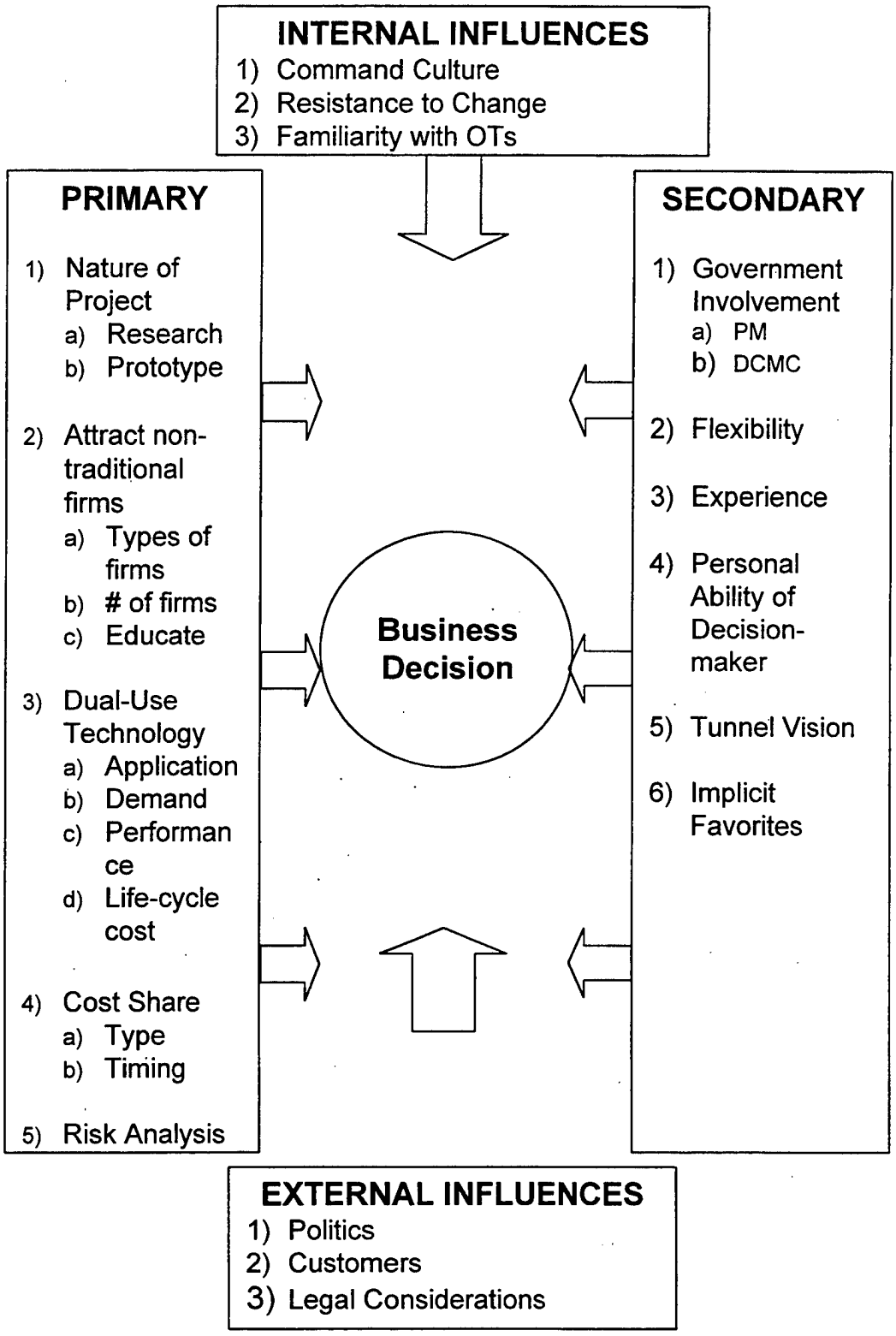


Figure 5.1. OT Decision Model [Source: Developed by Researcher]

a. Nature of Project

The decision-maker should consider the nature of the project. OTs may be used for the following projects:

- Research project.
- Prototype projects.

The use of OTs is limited by regulation, to research and prototype projects. In order to use an OT for a research project, the decision-maker must also determine that the research project is for other than the direct benefit of the Government. If considering a prototype project, the decision-maker must also determine if the project does involve production, since OTs cannot be used for production efforts. As discussed in Chapter IV, one of the barriers to using OTs was the growing difficulty distinguishing between a prototype and production unit, particularly in the computer field. Before using OTs, decision-makers must define the type of project under consideration and the intent of the project.

b. Attract non-traditional defense firms

The decision-maker should evaluate:

- Type of firms responding.
- Number of firms responding.
- Level of understanding of DoD requirement.

What type of firms are responding to the Broad Agency Announcement (BAA)? One of the principal objectives to using OTs is to attract firms that traditionally do not participate in defense business. If large, traditional defense firms, such as

Raytheon or Boeing, are responding to the BAA, then perhaps an instrument other than an OT should be used.

Second, the number of firms responding to the BAA should be noted. In granting authority to use OTs, Congress indicated that OTs should be used to enhance competition, to the maximum extent practicable. The evaluators should determine if the use of an OT is attracting an efficient number of firms to promote competition.

Third, DoD buying commands must do more than hope non-traditional defense firms are attracted to doing business with DoD. They must proactively promote to commercial industry what are the dual-use areas of interest for DoD. Decision-makers should ensure that the BAA was fully understood by commercial industry; this can be achieved by providing briefings on the dual-use areas of interest to commercial industry; educating these firms on the use of other transactions and cooperative agreements; and identifying what projects would not be considered acceptable. These actions may result in the buying commands receiving more responses, and better quality responses from industry.

c. Pursue Dual-Use Technology

The decision-maker should evaluate:

- Commercial and military application.
- Sufficient commercial demand.
- Performance improvements.
- Reductions in life-cycle costs (LCC).

Projects should be evaluated for both military and commercial application. Projects with dual-use technology have two distinct advantages for DoD. When the technology is developed, DoD would be able to take advantage of commercial production economies of scale, thus lowering the cost of weapon system production. The other advantage of dual-use technology is that DoD can capitalize on the commercial sector's continuous efforts to improve its products. By pursuing dual-use technology, DoD can reduce its weapon systems costs and increase capability.

Second, the evaluator should determine the level of commercial demand for this project. Sufficient commercial demand will indicate a base of commercial support that is not dependent on DoD business. Substantial commercial demand will also encourage firms to innovate to maintain advantage over their competitors and reduce reliance on DoD business for their viability.

The last two evaluation factors should be addressed together. To what extent does this project improve performance or reduce the life-cycle costs of DoD's weapons systems? The purposes of pursuing dual-use technology are to apply commercial technology to military weapon systems to enhance their performance and reduce their life-cycle costs. Dual-use technology can achieve these objectives through the reduction of acquisition cycle time. DoD is able to access current technology in the commercial sector, eliminating the time of developing its own technological infrastructure.

d. Cost-Share Arrangement

The decision-maker should evaluate:

- Evidence of cost-sharing.
- Type of cost-sharing proposed (cash, in-kind, other).
- Timing of cost-share.

To meet the statutory requirements for using OTs, the decision-maker should determine if the firms or consortia are proposing a cost-sharing arrangement. For research projects, the firms are required, to the maximum extent practicable, to contribute at least 50 percent of the costs of the projects. Although prototype projects do not have such a provision, cost sharing is encouraged. Cost sharing indicates that the firm or consortia are committed to the project and are willing to share in the project's risk. Before committing their own resources, the firms have done their own business decision analysis and concluded the project meets their objectives.

Second, evaluate the type of cost sharing the firm is proposing. The type of cost share proposed will indicate the level of commitment by the firm. If the firm proposes using cash or direct costs, such as man-hours or material, as its cost-share contribution, the firm is demonstrating a strong commitment to the pursuit of this project. However, if the firm proposes using non-financial resources, such as wear-and-tear on machinery, the firm is indicating it is not fully committed to the project. [Ref. 28:p. 5] DDR&E, in its guidance for OTs, has identified some forms of cost-sharing that are unacceptable and should not be considered in the cost-share evaluation. Costs incurred

from prior research and intellectual property rights were identified by DDR&E as unacceptable forms of cost sharing. [Ref. 28:p. 5]

Third, identify how and when the firm's cost-share will be applied to the project. If the firm suggests that its contribution come at the end of the project's life, that would indicate that the Government bears a disproportionate amount of the risk early in the project's life. [Ref. 44] That firm should not be evaluated as highly as other firms that suggest a more equal phasing of the cost-share.

e. Risk Analysis

Risk analysis is one factor that was not identified by the respondents, but should be placed as a principal factor to consider in the decision to use OTs. The risks of the requirement should be identified and evaluated to assist the decision-maker in determining if an OT is the right instrument to fulfill the requirement. Some factors to consider:

- Market research.
- Type and complexity of requirement.
- Urgency of requirement.
- Data rights.

Market research should be an essential part of the OT decision process. Market research provides the decision-maker information on industry's capabilities, the adequacy of price competition and the ability to do price analysis. This information allows the decision-maker to determine if the prices proposed are fair and reasonable.

As discussed in Chapter III, under contract type selection, the decision-maker should identify and evaluate the risks of the requirement, such as adequacy of price competition, price analysis, complexity of the requirement and urgency of need. Are there high-risk elements that may indicate that an OT may not be appropriate? The decision-maker should identify these high-risk elements and analyze their impact on cost and schedule. The determination of using an OT should include the recognition of risks and how these risks should be managed.

Another consideration under risk analysis relevant to OTs is the data rights provisions. As discussed in Chapter II, the Bayh-Dole Act does not apply to OTs. However, the researcher has found through literature research that the starting point with OTs is to use the provisions of the Bayh-Dole Act. The use of OTs allows DoD buying commands to negotiate the data rights to the agreement if it achieves program objectives and is in the best interests of the Government.

2. Secondary Factors

The researcher identified six factors that should also be considered in the OT decision process, but not to the extent of the primary factors. Two of the six originated from the data presented in Chapter IV. The remaining four were found in the research literature. The six secondary factors are: Government involvement, flexibility, experience, personal ability of the decision-maker, tunnel vision and implicit favorites.

a. Government Involvement

The decision-maker should identify who and to what extent Government officials will be involved in the OT process. Two participants, in particular, warrant

discussion because their perspectives are important in developing a workable OT agreement. They are program management officials and Defense Contract Management Command (DCMC).

DDR&E identified program management involvement as a factor to consider when using OTs for research projects. This factor should be considered for all types of OTs because OTs require more program management involvement during the formation of the agreement and during the execution of an OT. The decision-maker should determine if program management personnel are aware of the additional commitment required for OTs and are willing to accept their increased participation in the project.

Another Government participant in the OT process that should be included in the consideration stages of an OT is DCMC. DCMC has established four regional activities to handle the administrative function of OTs. By including DCMC in the early stages of the decision process of using OTs, DCMC could provide insight into the appropriateness of an OT. If an OT is selected, DCMC could improve the overall agreement and reduce problems between the Government and the other party during the administration phase of an OT.

b. Flexibility

The extent of flexibility required to structure an agreement between the Government and the other party should be considered in the OT decision process. In Chapter IV, PCOs identified flexibility as a principal objective to using OTs. The use of

an OT provides PCOs with the ability to tailor the agreement in order to achieve a beneficial arrangement between Government and the other party.

c. To Gain Experience

The newness of this instrument requires the PCOs to learn a new process. Instead of falling back on the FAR to protect the Government's interests, PCOs must rely on their judgment to think through what to include in an OT to achieve a good business deal with the other party. Using OTs to gain experience develops the judgment of all involved in the decision process: Directors of Contracting, PMs, PCOs and legal counsel. One of the guiding principles of Acquisition Reform is to rely more on the judgment of DoD's acquisition professionals. DoD buying organizations must be willing to extend themselves to use OTs and rely on the judgments of their Directors, PCOs, PMs and legal counsel to make the right decisions.

The next three factors were identified in the research literature. The researcher includes them in the OT decision process because they encourage the decision-maker to reflect on introspective factors. The decision-maker has to review the decision process and ensure alternatives are not being excluded due to personal abilities as a decision-maker, through tunnel vision or by having implicit favorites.

d. Personal Ability of Decision-Maker

Managers often rely on their intuition or judgment rather than hard data to make decisions. Due to the unstructured nature of OTs, decision-makers must rely more heavily on their judgment. Those empowered with the OT decision should have business sense and possess sound judgment.

e. Tunnel Vision

Tunnel vision is seeing a situation with mental blinders that restrict, consciously or unconsciously, the number of alternatives to consider. This perspective is in sharp contrast with the perception of an OT as a "blank sheet of paper." Decision-makers have to ensure tunnel vision does not creep into the OT decision process.

f. Implicit Favorites

Decision-makers have to be careful not to favor an alternative too early in the decision process because they may reject a better solution. This can be seen from both sides, either favoring an OT over other instruments or favoring standard contracts over OTs. Either perspective limits the options available to the decision-maker and may result in not selecting the best instrument.

These secondary factors, though not as important as the primary factors, serve a purpose. The secondary factors force the decision-maker to evaluate factors outside the project to determine when to use OTs. First, decision-makers need to include input from program management and DCMC to determine if an OT is appropriate and to achieve a better agreement. Second, consider if flexibility is needed in the terms and conditions to attract some of the best Science and Technology firms. Third, DoD buying organizations must be willing to use OTs and be willing to rely on the judgment of their key acquisition officials to determine the right time to use them. Lastly, whoever is entrusted with the OT decision should be competent and possess good business judgment.

3. Internal Influences

The data from the interviews reveal three influences, internal to the organization, that affect the OT decision process: the command culture, resistance to change and familiarity with OTs. A discussion of each follows.

a. Command Culture

From the data presented in Chapter IV, it appears that command culture contributed to the identification of barriers to using OTs. Nine of the ten respondents that identified no barriers to using OTs came from small buying commands that engaged in cutting-edge technology. These smaller commands more readily embraced change than their larger counterparts.

The command culture also shaped the formality of the OT decision process. The smaller commands had an informal process that involved the Director or Deputy Director of Contracting, PCOs and legal counsel. The larger commands had more formal decision processes that required the submission of Determination and Findings (D&Fs) or Business Decision Documents.

b. Cultural Resistance to Change

Another internal influence that affects the OT decision process is a cultural resistance to change. Changing behavior is difficult because, by nature, individuals are risk adverse. Buying commands that demonstrate a propensity toward change are more likely to accept OTs as a viable instrument.

c. Unfamiliarity with OTs

DoD is still learning to use OTs. A 1998 GAO Report indicated that as of FY97, 161 OTs had been issued by DoD buying commands. The newness of this instrument may cause some buying commands to hesitate using it. Those same buying commands that embraced change will have similar success developing PCOs' experience in using OTs. The larger DoD buying commands need to encourage use of OTs when appropriate. As DoD buying commands continue to use OTs the resistance to change and unfamiliarity with OTs will be reduced.

4. External Influences

Influences on the OT decision do not solely come from the within the organization. Decision-makers should recognize external influences, including politics, customers and legal considerations.

a. Politics

DoD is not immune to political influences. Politics does not just mean the influences of Congress. Buying commands should also consider the political elements within the Office of the Secretary of Defense (OSD) and within their Services. They should identify and foster support for their projects, but also recognize there will be opponents. How well the political process is managed could determine the success of OTs.

The authority to use OTs was granted under 10 U.S.C. 2371. In general, Congress has viewed favorably DoD's use of OTs for research. Congress has permanently legislated the authority for DoD to conduct OTs for research. Congress does

not hold the same view for DoD's use of OTs for prototypes. Congress has not granted permanent legislation, but extended DoD's authority to use OTs for prototypes on a trial basis until FY01. Members of Congress have expressed concern DoD was using OTs for prototypes to circumvent the acquisition system's management controls. Those buying commands using OTs or considering their use, should recognize Congressional interest in OTs is high and ensure their decisions to use OTs correspond to the intent of Congress.

b. Customers

Before discussing the influence of customers, buying commands have to identify who are their customers. Buying commands have at least two customers: the users and program managers (PMs). Buying commands will be influenced by both in the OT decision process. The users want the most technologically capable weapon systems. PMs want to satisfy the user, but must also balance the acquisition and life-cycle costs of the weapon systems. For their influence to be meaningful, both customers need to be educated in what are OTs and why they should be or not be used.

c. Legal Considerations

OTs are not a panacea. OTs are limited in their use to research and prototype products. Part of the education process discussed in the previous paragraph should include the legal limits of using this instrument. To ensure proper use of OTs, decision-makers should understand the laws associated with OTs and the intent behind the laws.

One area that requires clarification is the area of prototypes. There is a growing difficulty distinguishing between a prototype and a production unit. Without clarification, it poses a barrier to some buying commands in using OTs.

E. SUMMARY

In summary, the OT Decision Model presented in this chapter revolves around the business decision. The Model provides a descriptive decision process that recognizes the unique nature of OTs and importance of judgment. Five primary factors were identified: (1) nature of the project, (2) attract non-traditional firms, (3) dual-use technology, (4) cost share arrangement and (5) risk analysis. Each of these factors should be considered for every OT considered.

The Model further identified secondary factors that the decision-maker should consider that are outside the OT itself. The six identified factors are: (1) program management involvement, (2) flexibility, (3) to gain experience, (4) personal ability of the decision-maker, (5) tunnel vision and (6) implicit favorites.

Decision-makers should also realize there are internal and external influences that affect the OT decision process. The researcher identified three in each. Within the organization, the corporate culture, cultural resistance to change and the unfamiliarity of OTs influence acceptance and use of this new instrument. Politics, customers and legal considerations should be recognized as external influences. The decision-makers that carefully consider these factors and weigh them with the influences will make the better

business decisions. Chapter VI will present the researcher's conclusions, recommendations and identify areas for further research.

VI. CONCLUSIONS AND RECOMMENDATIONS

A. INTRODUCTION

The purpose of this research effort was to develop a decision model on when to use other transactions (OTs) at DoD buying commands. The researcher presents conclusions on the OT decision process and makes recommendations on improving the process at DoD buying commands. The final part of the chapter answers the research questions.

B. CONCLUSIONS

1. The Other Transaction Decision Model Revolves Around the Business Decision

This study determined that the decision process for deciding when to use OTs at DoD buying commands centered on the business decision. The business decision determines whether or not an OT should be used. The researcher developed an OT Decision Model that identified five principal and six secondary factors to consider in determining a good business decision. The five principal criteria are: nature of the product, attract non-traditional defense firms, pursue dual-use technology, cost share arrangement and risk analysis. The secondary factors are: involvement of Government personnel, to achieve flexibility, to gain experience, personal ability of the decision-maker, tunnel vision and implicit favorites. In achieving a good business decision, the decision-maker should identify the objective of the requirement and analyze if an OT is the appropriate instrument to facilitate the agreement between the Government and the

other party. This analysis requires an understanding of OTs, their limitations, their benefits, and associated risks.

OTs are defined as other than contracts, grants or cooperative agreements. The rules and regulations that apply to these instruments, such as, the Federal Acquisition Regulation (FAR) and Defense Acquisition Regulation Supplement (DFARS) do not apply to OTs. Congress established the authority to use OTs to provide Defense Advanced Research Projects Agency (DARPA) and the Services maximum flexibility to pursue research and development (R&D) efforts with commercial industry without the traditional Government contracting rules and regulations. OTs are intended to increase DoD's access to advanced technology, particularly by firms that traditionally do not participate in DoD business; influence commercial R&D into dual-use projects; and reduce DoD's life-cycle costs of its weapon systems.

However, this freedom from traditional contracting rules and regulations, also introduces potential risks to the Government in the areas of Intellectual Property Rights (IPRs) and terminations. OTs provide for the negotiation of IPRs when its achieves the objectives of the program and is in the best interests of the Government. The downside of negotiating IPRs is that the Government could place itself in a disadvantageous position if the project was to go into production. OTs also provide for the other party to terminate for its convenience after notifying the Government. If the other party elects to terminate, the Government may have very little to show for its investment. The business decision must weigh both the benefits and the risks of using OTs.

2. There Exists Consistency Among DoD Buying Commands, Regardless of Size, On What Are Their Command's Principal Objectives of Using "Other Transactions"

This study asked ten DoD buying commands, of varying sizes, what were their principal objectives using OTs. Their responses revealed consistencies among the DoD buying commands. The ten buying commands clearly identified four primary objectives of using OTs: be a good business decision, provide flexibility in the terms and conditions, attract non-traditional defense firms and pursue dual-use technology. The significance of the consistency between buying commands is that it reflects a common understanding of what the commands hoped to achieve by using OTs. If the commands identify the same objectives for using OTs, the more likely they will use the instrument as it was intended to be used.

3. Command Culture Determined the Extent of Barriers in Using "Other Transactions"

This study revealed that the command culture within a DoD buying command determined the existence of barriers to using OTs. Of those respondents that identified no barriers existed in using OTs, 90 percent came from small buying commands that engaged in high-risk, high-payoff projects. These commands, such as DARPA, were intentionally small to allow for flexibility. They were committed to frequent turnover of projects and personnel to bring in fresh ideas and prevent retrenchment of procedures and policies. In contrast, the larger buying commands did identify barriers to using OTs. A

command culture than encourages flexible and innovative thinking will have less problems implementing new processes, such as the use of OTs.

4. Internal Barriers to Using "Other Transactions" Will Be Reduced As They Are Used More Frequently

This study identified two internal barriers to using OTs within DoD buying organizations: cultural resistance to change and familiarity with using OTs. OTs are new instruments within DoD buying commands that require PCOs to learn a new process. Changing behavior is difficult because individuals are inherently risk-adverse. There is a natural reluctance to venture from the known to the unknown.

Organizations can encourage or discourage change to occur. This study revealed that the size of the buying command had influence on the identification of barriers using OTs. Those smaller organizations that embraced change did not identify barriers, internal or otherwise, in using OTs, while the larger DoD buying commands did identify barriers. The larger buying commands must be willing to encourage and influence their decision-makers to use OTs.

Another way to reduce this reluctance to change and to gain experience using OTs is to require the buying command to use OTs. Dual Use Science and Technology (DU S&T) Program requires the DoD buying commands to use OTs or cooperative agreements for their FY99 projects. By requiring OTs to be used in these projects, DU S&T Program assumes the responsibility of the OT decision process and encourages these buying commands to use this instrument to foster innovative agreements with commercial industry. As the buying commands develop experience and familiarity with

using OTs, they will become less resistant to use these instruments in the future. Therefore, the internal barriers will be reduced as the buying commands increase their use of OTs.

5. External Barriers to Using OTs Will Not Be Reduced, Even With More Frequent Use of OTs

This study identified four external barriers to using OTs: regulations, inability to use OTs for production, prototype definition and program default risk. Of those four, the first three barriers to using OTs will not be reduced with increased use of OTs. These barriers are outside the control of the buying organizations. Reducing these barriers would required changes in the statute, 10 U.S.C. 2371, and a decrease in the rate of technological advances. Both changes are unlikely in the near future.

Section 218 of the FY99 Defense Authorization Bill extended OT authority to engage in prototype projects, directly relevant to weapon systems, until FY01. Based on the language within the bill, it is unlikely Congress will make any changes to expand the authority to include production. In this bill, Congress cited concerns that DoD not use OT authority for prototype projects that circumvent the acquisition management controls already in place. Rather than permanently legislate OT authority for prototype projects, as they did for research projects, Congress merely extended it on trial basis for two more years. Congress' lukewarm response does not promote a sense of stability for using OTs for prototype projects in the future.

The second barrier identified is the inability to use OTs for production. DARPA has argued for expanding OT authority to include production, seamlessly transitioning

from prototype into production and sustaining the efficiencies achieved during prototype development. The nature of the language in the FY99 Defense Authorization Bill indicates Congress is leaning more toward limiting OT authority than expanding this authority to include production.

The third external barrier to using OTs, that will not be reduced with increased use of OTs, is the difficulty distinguishing a prototype unit from a production unit. This distinction was identified by some of the buying commands as limiting their use of OTs. The distinction will continue to blur as technology continues to advance.

6. Structure For Approving "Other Transactions" Is Consistent Among DoD Buying Commands

This study indicates that DoD buying commands have a similar organizational structure for approving OTs. All commands interviewed had an approval process where the PCOs brought up the decision to the Director or Deputy Director of Contracting for approval. Legal was involved in the decision process and, in some cases, the Program Manager (PM) and Defense Contracting Management Command (DCMC) were consulted. The significance of a consistent process to approve OTs is that it demonstrates an oversight mechanism is in place within DoD buying commands to decide when it is appropriate to use OTs.

Buying commands did, however, differ in the formality of the decision process. The larger organizations had a much more formal approval process than the smaller buying commands. The larger commands' approval process was very similar to the process used for FAR-type contracts. A Determination and Finding (DNF) or Business

Decision Document was required to justify why an OT would be the best instrument in this case and what benefits would accrue from the use of an OT. The smaller organizations had a more informal process where the decision was discussed among the Director, PCO and legal counsel. Despite the informal nature of the decision process, the approval structure and the people involved in the approval process were similar to the larger organizations.

C. RECOMMENDATIONS

1. Larger DoD Buying Commands Should Delegate the Authority to Use OTs Down to Their Field Organizations and Research Centers

Smaller commands are more flexible and are able to implement change within their organizations with less resistance. Some of these activities are already engaged in the pursuit of advanced technology and have experience using cooperative agreements. By providing these activities with the authority to use OTs, the larger buying commands would be enabling their smaller field offices to perform more effectively. OTs would provide these smaller organizations a flexible tool to attract non-traditional defense firms. The larger DoD buying organizations should use Naval Surface Warfare Center (NSWC) China Lake as an example of successful delegation of authority to use OTs to a field organization.

2. Clarify the Differences Between Prototype and Production to Facilitate Greater Use of "Other Transactions"

As technology continues to advance, the line between a prototype unit and production unit will continue to blur, particularly in the computer field. OTs are

currently prohibited from being used for production. This prohibition on using OTs for production could have negative impact on the use of OTs for prototype projects. In fact, some interview respondents indicated that they did not use an OT for a specific prototype project because the project too closely resembled a low-rate initial production unit. If DoD buying commands are having difficulty making the distinction between a prototype and production unit, they may be less likely to elect to use an OT over another instrument.

The researcher recommends that DoD develop a new definition of prototype, in light of the technological advances, that shows a clear distinction between prototype and production units. Clearly distinguishing between the two will prevent potential misuse of an OT and will encourage use of OTs. DoD buying commands should not have to reject using OTs for a viable project because the distinction between prototype and production was too narrow.

3. Implement Industry Briefings to Promote the Use of OTs Within Commercial Industry

The researcher found during data collection that some firms within commercial industry do not fully understand OTs. Commercial firms do understand that the rules and regulations that apply to traditional contracts do not apply to OTs, but did not clearly distinguish OTs from cooperative agreements. To encourage commercial firms to participate in OTs, DoD needs to educate them in the use of OTs. The researcher recommends DoD provide industry briefings to clarify what projects DoD envisions are

applicable to OTs, what DoD hope to achieve through OTs and why the use of an OT facilitates in a better agreement between DoD and commercial industry.

4. Educate DoD Acquisition Professionals in the Use of OTs

Congress has granted permanent authority to DARPA and the Services to use OTs for research projects. Congress has also extended authority on trial-basis for DARPA and the Services to use OTs for prototype projects through FY01. Continued Congressional support of this instrument requires that OTs be used when appropriate. This "appropriate" determination will require the application of sound judgment, experience and business acumen by individuals within DoD buying commands, skills that are not inherent within individuals. DoD buying commands must be committed to developing the judgment of their acquisition professionals.

First, DoD buying commands should provide the educational framework, classroom and on-the-job training, to develop the knowledge of their decision-makers in the use of OTs. Second, these commands need to encourage and foster the use of judgment through the issuance of guidance rather than procedures. Third, these commands need to recognize and reward good judgment. Lastly, these buying commands should include the stakeholders as integral elements in the OT decision process. The decision-makers should include the Directors of Contracting, PMs, PCOs, legal counsel and DCMC. By providing the necessary education, encouraging the use of judgment, rewarding those who make good business decisions and including all stakeholders, DoD buying commands will make the right decisions in regard to the use of OTs.

D. ANSWERS TO RESEARCH QUESTIONS

1. Subsidiary Research Question: What Are the Essential Elements of an Other Transaction?

An "other transaction" is defined by what it is not. An OT is not a contract, grant or cooperative agreement, but a distinct class of transactions. There are two types of OTs: research and prototype. Research OTs are used to advance and support research projects for other than the direct benefit of the Federal Government. Research OTs require a 50 percent cost share, to the maximum extent practicable, between the Government and the other party. They may be used when a contract, grant or cooperative agreement is not feasible.

In contrast to research OTs, prototype OTs are used to directly benefit the Federal Government, the cost share provision is not required and the instrument may be used even if contract, grant or cooperative agreement are feasible.

Authority to use OTs for basic, applied and advanced research was granted in 1989 to Defense Advanced Research Projects Agency (DARPA) under 10 U.S.C. 2371. It was further extended to the Military Departments under the FY92/93 Defense Authorization Bill. Congress expanded the authority to include prototypes directly relevant to weapon systems development in 1994 under Section 845 of the FY94 Defense Authorization Bill. This expanded authority was only applied to DARPA. In 1997, Congress extended this prototype authority to the Military Departments under the FY97 Defense Authorization Bill. OTs are intended to stimulate and support R&D, attract non-traditional defense firms and reduce life cycle costs of DoD weapon systems.

2. Subsidiary Research Question: What Policies and Restrictions Limit the Use of Other Transactions at DoD Buying Commands?

The researcher found six limitations to using OTs at DoD buying commands, two internal to the organization and four outside the organization. The internal barriers were: (1) cultural resistance to change and (2) lack of familiarity with OTs. The external barriers identified were: (1) regulations, (2) inability to use OTs for production, (3) prototype definition and (4) program default risk.

3. Subsidiary Research Question: What Are Essential Elements of a Decision Model?

Theoretical decision models are intended to assist managers in understanding the decision process. Three decision models were presented in this research effort: a Rational Decision Model, a Descriptive Decision Model and Contract Type Selection Model.

A Rational Decision Model describes the decision process that leads to an optimal solution. Six steps are identified in this model: (1) identify the problem, (2) identify criteria, (3) weight criteria, (4) identify alternatives, (5) evaluate alternatives and (6) select the optimal solution.

A Descriptive Decision Model describes how decisions are actually made. This Model recognizes the bounded nature of human rationality and describes the decision process within this context. Managers operate in complex environments with finite, personal abilities. They often rely on heuristics, or "rules of thumb" to manage in this environment. To be effective, managers should recognize the presence and limitations of

heuristics, understand factors that influence decision-making and apply this knowledge to improve their decision-making.

A Contract Type Selection Decision Model describes the steps involved in selecting a contract type at Government buying commands. The contract type selected should be one that reasonably allocates the risks identified between the contractor and the Government and provides incentive for the contractor to achieve or exceed specific performance objectives.

All three models describe the managers' decision-making process. Understanding the process and how the decision-makers interact within the process, can improve their own decision-making and lead to better decisions.

4. Subsidiary Research Question: What Are the Principal Objectives of DoD Buying Commands in Using Other Transactions?

DoD buying commands identified nine principal objectives of using OTs. The four top objectives identified by DoD buying commands are: (1) a good business decision, (2) attract non-traditional defense firms, (3) instill flexibility in the acquisition process and (4) pursue dual-use technology. There was a clear consensus among DoD buying commands on what they hope to achieve through OTs.

5. What Principal Decision Criteria Did DoD Buying Commands Identify In Determining When to Use Other Transactions?

The respondents identified nine principal decision criteria. The top five decision criteria used by DoD buying commands in determining when to use OTs are: (1) reflect good business judgment, (2) attract non-traditional defense firms, (3) nature of the

product, (4) pursue dual-use technology and (5) cost share arrangement. The researcher determined of those five, the primary decision criterion was the business decision. The other four represented primary factors to consider in the business decision.

6. Primary Research Question: What Are the Principal Decision Criteria to Determine When to Use Other Transactions?

The researcher found that the OT Decision Model revolved around the business decision. Five principal decision criteria were identified by the researcher: (1) nature of the product, (2) non-traditional defense firms, (3) dual-use technology, (4) cost share arrangement and (5) risk analysis. Four of the five decision criteria were identified by the respondents from the DoD buying commands. The fifth criterion was included by the researcher to ensure the decision-makers conducted risk analysis before making the business decision.

E. AREAS FOR FURTHER STUDY

1. Develop Performance Measurements to Determine If Other Transactions Are Achieving Their Objectives

This study focuses on developing a Decision Model on when to use OTs. How effective was that decision? The researcher recommends developing performance measurements, both quantitative and qualitative, to determine if other transactions are achieving the objectives identified by the DoD buying commands.

2. How Well Have DoD Buying Commands Administered Other Transactions?

This study revealed that DCMC was not always included in the up-front decision process on when to use OTs. Yet DCMC is responsible for administering the OTs once they are issued. Therefore, it is recommended that the administration of OTs be researched to determine if early involvement by DCMC in the OT process would benefit the administration of OTs.

3. What Are Common Heuristics, or "Rules Of Thumb" In Using Other Transactions?

This study revealed that decision-makers use heuristics to manage in a complex environment. Heuristics, however, have biases that could cause the decision-maker to make a faulty decision. It would be worthwhile to identify what common heuristics and associated biases are used in the OT process.

APPENDIX. INTERVIEWS WITH ACQUISITION PROFESSIONALS

1. Amster, B., Legal Counsel, SPAWAR, San Diego, CA, 25 September 1998.

2. Bocar, G., Legal Counsel, NSWC China Lake, China Lake, CA, 23 September 1998.

3. Booth, L., Policy, Defense Procurement, Washington, D.C., 7 October 1998.

4. Boyer, L., Division Director of Contracts, ONR, Washington, D.C., 28 October 1998.

5. Branch, E., SES, ASN(RDA(DABM)), Washington, D.C., 16 October 1998.

6. Cotner, M., Contracting Officer, SPAWAR, San Diego, CA, 10 August 1998.

7. Cowley, M., CAPT, USN, Naval Air System Command (NAVAIR 2.0), Patuxent River, MD, 9 November 1998.

8. Davis, T., Contracting, SPAWAR, San Diego, CA, 10 August 1998.

9. Dellomo, A., Contracting Officer, Army Electronic Command, Monmouth, NJ, 18 September 1998.

10. Duanes, J., Legal Counsel, OSP, Washington, D.C., 14 October 1998.

11. Fasini, S., Contracting Officer, NAVAIR, Patuxent River, MD, 28 October 1998.

12. Fisher, A., Contracting, NAVAIR, Patuxent River, MD, 14 September 1998.

13. Freeman, L., Contracting Officer, NSWC China Lake, China Lake, CA, 28 September 1998.

14. Furman, V., Contracting Officer, NAVAIR, Patuxent River, MD, 14 October 1998.

15. Gilligan, D., Contracting Officer, Army Electronic Command, Monmouth, NJ, 28 September 1998.

16. Ginman, R., RADM, ASN(RDA(ABM)), Washington, D.C., September 1998.

17. Gnerlich, J., Legal Counsel, ONR, Washington, D.C., 13 November 1998.

18. Herbst, M., Policy, Defense, Research & Engineering (DR&E), Washington, D.C., 21 September 1998.

19. Jones, M., LCDR, USN, Contracting Officer, Naval Sea Systems Command (NAVSEA), Washington, D.C., 17 September 1998.

20. Lake, S., Army Research and Development (SARDA) Washington, D.C., 15 September 1998.

21. Lamade, S., SES, Deputy Director of Contracting, Naval Space and Warfare Systems Command (SPAWAR), San Diego, CA, 25 September 1998.

22. McCullough, L., Division Director of Contracting, ONR, Washington, D.C., 16 October 1998.

23. McLaury, L., Contracting Officer, SPAWAR, San Diego, CA, 10 August 1998.

24. Nichols, S, Contracting Officer, NAVAIR, Patuxent River, MD, 13 October 1998.

25. Nurse, C., Contracting Officer, DARPA, Washington, D.C., 14 October 1998.

26. Packman-Simms, L., Contracting Officer, Army Electronic Command, Monmouth, NJ, 28 September 1998.

27. Padilla, D., Director of Contracting, Office of Naval Research, Washington, D.C., 21 September 1998.

28. Patanito, P., Director Contracting, Dual Use Science and Technology Program, DDR&E, Washington, D.C., 13 November 1998.

29. Paul, R., Contracting Officer, NSWC China Lake, China Lake, CA, 28 September 1998.

30. Peek, T., Contracting Officer, Sacramento Air Logistics Command, Sacramento, CA, 14 October 1998.

31. Popkin, K., Contracting Officer, NIMA, Washington, D.C., 28 September 1998.

32. Reed, L., Contracting, Air Force Material Command, Dayton, OH, 15 September 1998.

33. Renta, M., Contracting Officer, NSWC China Lake, China Lake, CA, 28 September 1998.

34. Rentz, F., Contracting Officer, SPAWAR, San Diego, CA, 11 August 1998.

35. Riffe, S., Contracting Officer, Marine Corps Systems Command (MARCORSYSCOM), Quantico, VA, 18 September 1998.

36. Schrock, J., Contracting Officer, SPAWAR, San Diego, CA, 10 August 1998.

37. Sharkus, D., Director of Contracting, Defense Advanced Research Projects Agency (DARPA), Washington, D.C., 15 September 1998.

38. Sidebottom, D., Legal Counsel, DARPA, Washington, D.C., 2 November 1998.

39. Sullivan, M., RADM, USN, Deputy Assistant Secretary of the Navy for Research, Development and Acquisition (DASN(RDA)), Washington, D.C., 10 September 1998.

40. Swatloski, R., Contracting Officer, DARPA, Washington, D.C., 28 October 1998.

41. Thornewell, D., Division Director of Contracts, SPAWAR, San Diego, CA, 25 September 1998.

42. Ulery, S., Contracting Officer, DARPA, Washington, D.C., 28 September 1998.

43. Wolff, B., Contracting Officer, National Imagery and Mapping Agency (NIMA), Washington, D.C., 28 September 1998.

LIST OF REFERENCES

1. Gansler, Jaques, Deputy Under Secretary of Defense Acquisition and Technology, "Defense Modernization: Transforming the Way the Pentagon Does Business," 18 February 1998.

2. Aspin, Les, Representative, Chairman of the House Armed Services Committee, Paper on "National Security in the 1990s: Defining a New Basis for U.S. Military Forces," 6 January 1992.

3. http://www.acq.osd.mil/ddre/docs/Kitfield.html "The Pentagon's Plan," pp. 1-4, November 1994.

4. 10 U.S. Code 2371.

5. Dunn, Richard L., "DARPA Turns to 'other transactions'," Aerospace America, pp. 33-37, October 1996.

6. http://www.darpa.mil/jdupo/trp.mil,"The Technology Reinvestment Project."

7. http://www.darpa.mil/jdupo/annual_95/intro.html, "Introduction to Technology Reinvestment Project."

8. Howell, Robert E., *Using Other Transactions as an Effective Contractual Vehicle,* Master's Thesis, Naval Postgraduate School, Monterey, CA, December 1997.

9. Slade, William C., *Other Transactions for Prototypes As Used in the Commercial Initiative 1997: A Contractor's Perspective,* Master's Thesis, Naval Postgraduate School, Monterey, CA, June 1998.

10. Joint Vision 2010, "America's Military: Preparing for Tomorrow."

11. Gansler, Jaques, Testimony Before the Subcommittee on Acquisition and Technology, March 1998.

12. Gansler, Jacques, "Gansler Delivers Keynote Address at Executive Acquisition Symposium," Program Management, pp. 6-11, January-February 1998.

13. General Accounting Office, Report to Congressional Committees, DEFENSE INDUSTRY, Trends in DoD Spending, Industrial Productivity, and Competition, January 1997.

14. www.acq.osd.mil/at/, Introduction.

15. http://www.defenselink.mil/speeches/1997/df1216.html Defense Issues: Volume 12, Number 16, "Fielding Equipment Second to None," December 1997.

16. Federal Acquisition Regulation.

17. Preston, Colleen, "Defense Performance Review/Strategic Plan Acquisition Reform," Draft (not published), pp. 1-14, 09 August 1993.

18. Bolos, Joseph T., A Report of the Use of 10 U.S.C. 2371 "Other Transaction" Authority and 10 U.S.C. 2371 Section 845 Prototype Authority in the Department of Defense, [http://www.darpa.mil/cmd/pages/toc.html], March 1997.

19. Dunn, Richard L., "Other Applications for 'Other Transactions'," Aerospace America, pp. 35-40, September 1997.

20. National Defense Industrial Association Position Paper, "Section 218 (S. 2057), Extension of Authority to Carry Out Certain Prototype Projects," September 1998.

21. Larry Lynn, Director of Defense Advanced Research Projects Agency Testimony before Armed Services Subcommittee on Acquisition and Technology, U.S. Senate, 11 March 1997.

22. "ARPA Signs 100 Innovative Agreements over Five Years," [http://www.defenselink.mil/news/Sep1995/b092295_b[illegible]21-95.html], 22 September 1995.

23. Kuyath, R., "The Untapped Potential of the Department of Defense's 'Other Transaction' Authority," Public Contract Law Journal, Vol. 24, No. 4, pp 1-55, Summer 1995.

24. 10 U.S. Code 2501.

25. General Accounting Office, Acquiring Research by Nontraditional Means. NSIAD, 96-11, March 29, 1996.

26. ASN (RD&A) memo of 11 Jul 97 to Commanders, Major Navy and Marine Corps Systems Commands, Guidance on the Use of Other Transactions Authority under 10 U.S.C. 2371.

27. Telephone conversation between D. Padilla, Director of Contracting, ONR, Washington, D.C., and the author, 21 September 1998.

28. Director of Defense Research and Engineering Memorandum to Secretaries of the Military Departments, Service Acquisition Executives, Director, Defense Advanced Research Projects Agency, Subj: Instruments for Stimulation of Research, 2 December 1997.

29. Interview between Ginman, R., Rear Admiral (LH) Office of Assistant Secretary of the Navy, Research, Development & Acquisition (ASN RD&A), Director of Acquisition & Business Management (ABM), and the author, August 9 1998.

30. Defense Research and Engineering web site, [http://www.acq.osd.mil/ddre /research].

31. Telephone conversation between M. Herbst, Policy, Defense Research and Engineering, Washington, D.C., and the author 21 September 1998.

32. Defense Procurement web site, [http://www.acq.osd.mil/dp/].

33. Telephone conversation between L. Booth, Policy, Defense Procurement, Washington, D.C., and the author, 7 October 1998.

34. "Guide on Section 845/804 Other Transactions for Prototype Projects," Draft (not published), Defense Procurement.

35. Templin, Carl R., LTCOL, "Defense Contracting Buyer-Seller Relationships: Theoretical Approaches, Acquisition Review Quarterly, pp. 114-28, Spring 1994.

36. Bazerman, M.H., *Judgement in Managerial Decision Making*, John Wiley & Sons, Inc., 1994.

37. Mondy, R.W., Sharplin, A., Premeaux, S.R., *Management, Concepts, Practices and Skills, 5TH ed., Allyn and Bacon,* 1991.

38. Sherman, S.N., *Government Procurement Management*, pp. 207-221, Wordcrafters Publications, 1997.

39. *Contracting by Negotiation*, Current Through FAC 90-17, Chapter 4, National Contract Management Association.

40. Polowczyk, J.P., *Market Research in the United States Navy: A Study of the Skills and Tools Required to Conduct Market Research*, Master's Thesis, Naval Postgraduate School, Monterey, CA, December 1996.

41. Adams, C.J., Hevey, B.G., Shaw, R.W., NDI ACQUISITION: An Alternate to 'Business as Usual', Report of the DSMC 1991-2 Military Research Fellows, Defense Systems Management College, October 1992.

42. U.S. Department of Defense, Inspector General, Audit Report on Financial and Cost Aspects of Other Transactions (Report No. 98-191), Government Printing Office, Washington, D.C., 1998.

43. Defense Acquisition Deskbook, June version.

44. Director of Defense Research and Engineering Memorandum to Deputy Assistant Secretary of the Air Force (Science, Technology and Engineering), Chief of Naval Research, Deputy Assistant Secretary of the Army (Research and Technology), Subj: Dual Use Science and Technology (DU S&T) Program, 7 July 1998.

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center 2
   8725 John J. Kingman Road, Suite 0944
   Fort Belvoir, VA 22060-6218

2. Dudley Knox Library 2
   Naval Postgraduate School
   411 Dyer Road
   Monterey, CA 93943-5101

3. Commander, Space & Naval Warfare System Command 1
   Attn: Deputy Director of Contracts 02A
   4301 Pacific Highway
   San Diego, CA 92110-3127

4. David A. Smith (Code SM/Sv) 1
   Naval Postgraduate School
   Monterey, CA 93943-5103

5. Mark W. Stone (Code SM/St) 1
   Naval Postgraduate School
   Monterey, CA 93943-5103

6. Prof. David V. Lamm (Code SM/Lt) 5
   Naval Postgraduate School
   Monterey, CA 93943-5103

7. William P. Hayes 2
   7407 Hogarth St.
   Springfield, VA 22151